C21.5 : 947/4

Vol. 947 Number 4

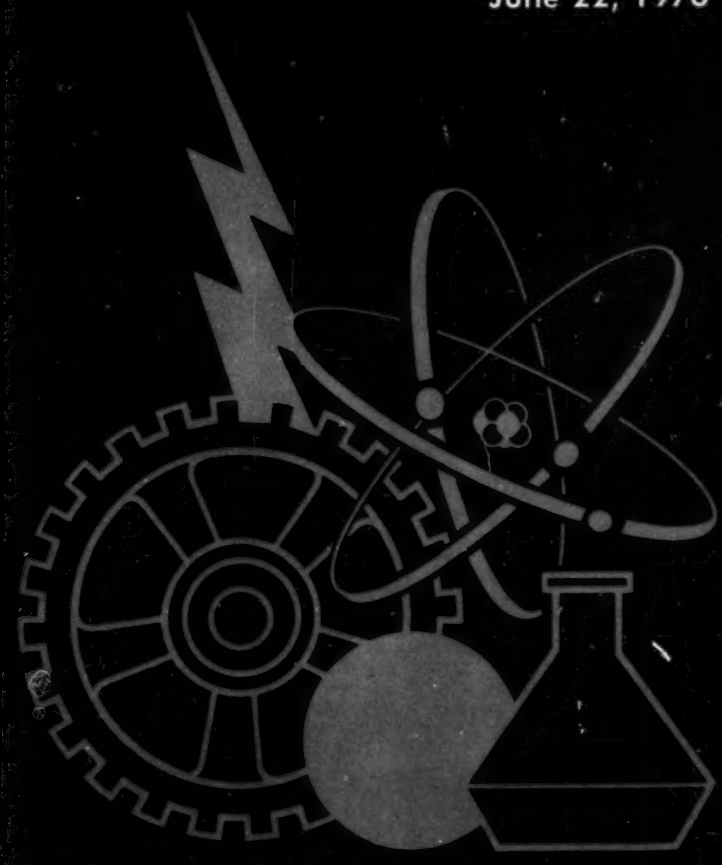
# OFFICIAL GAZETTE

of the

## UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

June 22, 1976



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OFFICIAL GAZETTE of the
UNITED STATES PATENT and TRADEMARK OFFICE

June 22, 1976 Volume 947 Number 4

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OFFICIAL GAZETTE of the
UNITED STATES PATENT and TRADEMARK OFFICE

June 25, 1974 Volume 917 Number 4

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# SPECIAL BICENTENNIAL GRANT COVERS

The Patent and Trademark Office will use special grant covers with a bicentennial motif on patents issued and trademarks registered, beginning July 6, 1976 and continuing through the last six months of 1976.

The patent covers will be printed in blue on white paper, with a bicentennial motif, bound with red ribbon and sealed with a gold seal.

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Reduced size samples of these special covers are illustrated below.

May 25, 1976.

C. MARSHALL DANN,
*Commissioner of Patents and Trademarks.*

1776 - 1976

THE UNITED STATES OF AMERICA

CERTIFICATE OF REGISTRATION

*This is to certify that the records of the Patent and Trademark Office show that an application was filed in said Office for registration of the Mark shown herein, a copy of said Mark and pertinent data from the Application being annexed hereto and made a part hereof.*

*And there having been due compliance with the requirements of the law and with the regulations prescribed by the Commissioner of Patents and Trademarks.*

*Upon examination, it appeared that the applicant was entitled to have said Mark registered under the Trademark Act of 1946, and the said Mark has been duly registered this day in the Patent and Trademark Office on the*

SUPPLEMENTAL REGISTER

*to the registrant named herein.*

*This registration shall remain in force for Twenty Years unless sooner terminated as provided by law.*

*In Testimony Whereof I have hereunto set my hand and caused the seal of the Patent and Trademark Office to be affixed this*

*C. Marshall Dann*

COMMISSIONER OF PATENTS AND TRADEMARKS

AMERICAN REVOLUTION BICENTENNIAL
1776 - 1976
No.
THE UNITED STATES OF AMERICA
TO ALL TO WHOM THESE PRESENTS SHALL COME:
WHEREAS THERE HAS BEEN PRESENTED TO THE
COMMISSIONER OF PATENTS AND TRADEMARKS
A PETITION PRAYING FOR THE GRANT OF LETTERS PATENT FOR AN ALLEGED NEW AND USEFUL INVENTION THE TITLE AND DESCRIPTION OF WHICH ARE CONTAINED IN THE SPECIFICATIONS OF WHICH A COPY IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THEREIN IS, FROM THE RECORDS OF THE PATENT AND TRADEMARK OFFICE IN THE CLAIMANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID CLAIMANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A PATENT UNDER THE LAW.
NOW, THEREFORE, THESE LETTERS PATENT ARE TO GRANT UNTO THE SAID CLAIMANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID CLAIMANT(S) FOR THE TERM OF SEVENTEEN YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF ISSUE FEES AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM MAKING, USING OR SELLING THE SAID INVENTION THROUGHOUT THE UNITED STATES.
IN TESTIMONY WHEREOF I have hereunto set my hand and caused the seal of the PATENT AND TRADEMARK OFFICE to be affixed at the City of Washington this day of in the year of our Lord one thousand nine hundred and seventy-six, and of the Independence of the United States of America the two hundredth and first.
Attest:
Acting Officer
Commissioner of Patents and Trademarks

# PATENT NOTICES

## Certificates of Correction for the Week of June 22, 1976

| | | | |
|---|---|---|---|
| P.P. 3,845 | 3,888,164 | 3,929,464 | 3,941,428 |
| Re. 28,649 | 3,890,146 | 3,929,782 | 3,941,578 |
| 3,276,651 | 3,890,226 | 3,930,045 | 3,941,782 |
| 3,552,511 | 3,891,642 | 3,930,628 | 3,942,949 |
| 3,632,328 | 3,892,788 | 3,930,736 | 3,943,087 |
| 3,774,441 | 3,894,930 | 3,930,835 | 3,943,402 |
| 3,791,378 | 3,897,566 | 3,930,878 | 3,943,416 |
| 3,796,565 | 3,902,065 | 3,930,974 | 3,943,451 |
| 3,806,509 | 3,903,184 | 3,931,107 | 3,943,500 |
| 3,806,528 | 3,903,541 | 3,931,126 | 3,943,823 |
| 3,807,235 | 3,904,240 | 3,931,171 | 3,943,893 |
| 3,808,256 | 3,905,697 | 3,932,175 | 3,943,957 |
| 3,809,498 | 3,906,203 | 3,932,318 | 3,943,996 |
| 3,809,717 | 3,907,952 | 3,932,362 | 3,944,382 |
| 3,812,028 | 3,908,494 | 3,932,424 | 3,944,544 |
| 3,817,935 | 3,910,874 | 3,932,469 | 3,945,356 |
| 3,819,749 | 3,912,603 | 3,932,535 | 3,945,365 |
| 3,826,639 | 3,912,795 | 3,932,824 | 3,945,434 |
| 3,826,800 | 3,913,579 | 3,933,936 | 3,945,817 |
| 3,829,782 | 3,914,181 | 3,934,926 | 3,945,893 |
| 3,842,427 | 3,914,501 | 3,934,969 | 3,946,559 |
| 3,845,774 | 3,915,812 | 3,935,149 | 3,946,807 |
| 3,846,432 | 3,916,130 | 3,935,257 | 3,947,497 |
| 3,851,220 | 3,916,627 | 3,935,548 | 3,947,498 |
| 3,854,637 | 3,917,062 | 3,935,614 | 3,947,525 |
| 3,855,516 | 3,918,565 | 3,936,211 | 3,947,571 |
| 3,860,654 | 3,919,103 | 3,936,710 | 3,947,608 |
| 3,862,111 | 3,919,364 | 3,936,949 | 3,947,695 |
| 3,867,416 | 3,919,546 | 3,937,228 | 3,947,942 |
| 3,868,466 | 3,919,981 | 3,937,252 | 3,948,281 |
| 3,869,647 | 3,922,612 | 3,937,843 | 3,948,455 |
| 3,869,721 | 3,922,993 | 3,937,878 | 3,948,892 |
| 3,871,373 | 3,923,271 | 3,938,111 | 3,948,955 |
| 3,873,457 | 3,923,324 | 3,938,962 | 3,949,033 |
| 3,873,907 | 3,923,414 | 3,939,289 | 3,949,259 |
| 3,876,912 | 3,923,615 | 3,939,392 | 3,949,394 |
| 3,879,158 | 3,924,630 | 3,939,551 | 3,949,786 |
| 3,880,282 | 3,925,720 | 3,940,029 | 3,950,561 |
| 3,880,506 | 3,926,391 | 3,940,178 | 3,951,100 |
| 3,880,946 | 3,926,782 | 3,940,276 | 3,951,525 |
| 3,880,947 | 3,927,767 | 3,940,390 | 3,951,775 |
| 3,881,703 | 3,928,760 | 3,940,397 | 3,953,178 |
| 3,885,778 | 3,928,836 | 3,940,461 | 3,953,570 |
| 3,887,647 | 3,928,859 | 3,940,981 | |

## Adverse Decisions in Interferences

In the designated interferences involving the indicated claims of the following patents, final decisions have been rendered that the respective patentees were not the first inventors with respect to the claims listed.

Patent No. 3,510,558, K. Hamuro, INSECTICIDAL COMPOSITION OF 5-BENZYL-3-FURYLMETHYL dl-CIS, TRANS-CHRYSANTHEMATE AND 3,4,5,6-TETRAHYDROPHTHALIMIDOMETHYL dl-CIS, TRANS-CHRYSANTHEMATE, Interference No. 98,813, decided Mar. 19, 1976, claim 1.

Patent No. 3,575,846, G. P. Hamner and R. B. Mason, CATALYSTS FOR THE SELECTIVE CONVERSION OF STRAIGHT-CHAIN HYDROCARBONS, Interference No. 98,229, decided Mar. 25, 1976, claim 13.

Patent No. 3,653,065, A. D. Brown, Jr., ELECTROGRAPHIC RECORDING SYSTEM WITH INTERLEAVED ELECTRODE GROUPS, Interference No. 98,422, decided Nov. 25, 1975, claims 2, 3, 4 and 5.

Patent No. 3,660,360, D. K. Ray-Chaudhuri and C. P. Iovine, WATER- AND OIL REPELLENCY AGENTS, Interference No. 98,869, decided Apr. 6, 1976, claims 1, 2 and 12.

Patent No. 3,668,211, A. Crabtree, CERTAIN 6-HYDROXY 2-(1H) PYRIDONES, Interference No. 98,958, decided Mar. 26, 1976, claims 1 and 2.

Patent No. 3,691,509, S. J. Krol, SHIELDED FLAT CABLE CONNECTOR ASSEMBLY, Interference No. 98,421, decided Aug. 29, 1974, claims 2 and 3.

Patent No. 3,745,504, J. B. Mooney, IMPREGNATED POROUS PHOTOCONDUCTIVE DEVICE AND METHOD OF MANUFACTURE, Interference No. 98,812, decided Mar. 11, 1976, claims 8, 9, 10, 11, 12, 13 and 14.

Patent No. 3,752,668, E. S. Baltazzi, ORGANIC PHOTOCONDUCTIVE MEMBERS COMPRISING DICYANOMETHYLENE SUBSTITUTED FLUORENE SENSITIZERS, Interference No. 98,754, decided Mar. 26, 1976, claim 3.

Patent No. 3,757,401, H. R. Beisch and W. C. Trute, METHOD OF MANUFACTURING VEHICLE WHEEL TRIM, Interference No. 98,917, decided Mar. 17, 1976, claims 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 17, 18, 19, 20, 23, 24, 30, 31, 32, 33, 34 and 35.

Patent No. 3,788,129, G. C. Trussell, SELECT SIGNAL ENGINE DIAGNOSING APPARATUS, Interference No. 98,891, decided Apr. 16, 1976, claims 1 and 5.

Patent No. 3,796,843, G. H. Durkee, P.G. Wareberg, A. C. Yoder, CALCULATOR KEYBOARD SWITCH WITH DISC SPRING CONTACT AND PRINTED CIRCUIT BOARD, Interference No. 99,108, decided Mar. 26, 1976, claims 1 and 7.

Patent No. 3,867,645, P. K. Weimer, CIRCUIT FOR AMPLIFYING CHARGE, Interference No. 99,007, decided Apr. 6, 1976, claims 1, 3, 4, 6, 7, 10 and 11.

# PATENT EXAMINING CORPS

**RENE D. TEGTMEYER, Assistant Commissioner**

**WILLIAM FELDMAN, Deputy Assistant Commissioner**

## CONDITION OF PATENT APPLICATIONS AS OF JUNE 5, 1976

| PATENT EXAMINING GROUPS | Actual Filing Date of Oldest New Case Awaiting Action |
|---|---|
| **CHEMICAL EXAMINING GROUPS** | |
| GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices. | 7-2-75 |
| GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides. | 9-12-75 |
| HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes. | 3-14-75 |
| COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography. | 8-4-75 |
| SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes. | 7-11-75 |
| **ELECTRICAL EXAMINING GROUPS** | |
| INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales. | 4-1-75 |
| SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material. | 8-1-75 |
| INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts. | 6-6-75 |
| RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Fo...; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating. | 12-5-75 |
| ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring. | 6-16-75 |
| DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts. | 2-18-75 |
| **MECHANICAL EXAMINING GROUPS** | |
| HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment. | 7-2-75 |
| MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks. | 11-3-75 |
| AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination. | 6-26-75 |
| HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication. | 5-19-75 |
| GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines. | 11-7-75 |

**Expiration of patents:** The patents within the range of numbers indicated below expire during June 1976, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,888,679 to 2,893,004 inclusive
Plant Patents..... Numbers 1,838 to 1,849 inclusive

# REISSUES

## JUNE 22, 1976

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

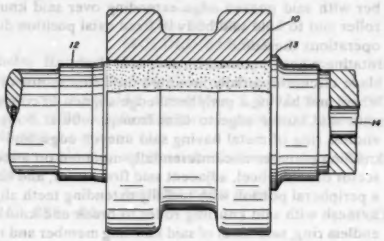
### Re. 28,868
### METHOD OF FORMING COMPOSITE ROLLS

Carl E. Spaeder, Jr., Monroeville Borough, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Original No. 3,820,212, dated June 28, 1974, Ser. No. 295,390, Oct. 5, 1972. Application for reissue Sept. 18, 1974, Ser. No. 507,037

Int. Cl.² B23P *11/00;* B21H *1/14*

U.S. Cl. 29—148.4 D 10 Claims



1. A method of forming a composite roll which has a hard wear-resistant metal shell and a tough shock-resistant arbor *encircled by said shell*, said method comprising:

relatively machining the shell and arbor to provide a total clearance therebetween of 0.003 to 0.005 inch based on diameter when the parts are at room temperature;

applying an adhesive to *the cylindrical surface of the body of* said arbor;

assembling the shell and arbor;

heating the adhesive to its curing temperature;

slowly cooling the assembled shell and arbor; and dressing the shell to its finished dimensions.

---

### Re. 28,869
### CARTRIDGE MAGAZINE FOR POWER TOOLS

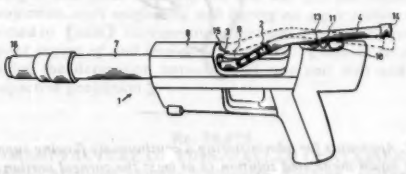
Karl Erich Samuel Erixon, Huskvarna, Sweden, assignor to Gunnebo Bruks Aktiebolag, Gunnebobruk, Sweden

Original No. 3,808,723, dated May 7, 1974, Ser. No. 319,395, Dec. 29, 1972. Application for reissue Feb. 14, 1975, Ser. No. 550,148

Claims priority, application Sweden, Apr. 4, 1972, 4292/72

Int. Cl.² F41C *25/00*

U.S. Cl. 42—6 8 Claims



*12. A cartridge magazine for loading cartridges into a cartridge chamber disposed in an inner end of a barrel of a power tool, said magazine being adapted to be fixed on the outside of the tool in a holder means and being provided with a rotatable drum having a multitude of channels lying next to one another in which cartridges are contained in series behind one another, wherein the drum is mounted inside a casing which is mounted in said holder means and tiltable between two end positions, and wherein one of the channels in one of said end positions of the casing communicates with the cartridge chamber of the tool to effect loading thereof.*

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### Re. 28,870
### COPING STRUCTURE

Julian J. Attaway, and Randolph W. Driggers, both of Tucker, Ga., assignors to MM Systems Corporation, Tucker, Ga.

Original No. 3,862,531, dated Jan. 28, 1975, Ser. No. 395,277, Sept. 7, 1973. Application for reissue Aug. 20, 1975, Ser. No. 606,088

Int. Cl.² E04F *19/02*

U.S. Cl. 52—300 19 Claims

1. In a coping structure for capping a wall, the combination which includes; a pair of inverted channel-like coping members having contiguous longitudinal end portions forming a transverse seam and said pair of coping members each comprising a web disposed over the top of said wall, and front and rear legs projecting from said web and extending adjacent to said wall outside front and rear sides of said wall respectively, said front and rear legs of each of said pair of coping members including portions to be engaged for restraining said coping member at least against upward movement forwardly and rearwardly in said coping structure; and splice and first support means, said means including a splice member comprising front and rear legs and a web interconnecting said splice member legs, said splice member legs and web being across said seam and in overlap with said legs and webs of said pair of coping members inside the channels of said pair of coping members, and splice support structure securely on said wall and including a web and front and rear legs interconnected by said web of said splice support structure, said front and rear legs and web of said splice support structure being disposed intermediately of said wall and said front and rear legs and web of said splice member, said front leg of said splice support structure having a portion to be engaged with said front leg portions of said pair of coping members for arresting at least upward movement of said pair of coping members, and said rear leg of said splice support structure having a portion for being engaged with said rear leg portions of said pair of coping members for arresting at least upward movement of said pair of coping members, said splice support structure web comprising a raised forward web portion supported by said front leg of said splice support structure for said splice support structure to sustain said splice member web while said splice member web is contiguous to said webs of said pair of coping members forwardly in said coping structure and impede said pair of coping members forwardly against downward movement, having said pair of coping members arrested at least against upward movement through said portions of said front legs of said pair of coping members and said front leg portion of said splice support structure being engaged, and said splice support structure further being characterized by said web thereof having a lower rearward portion adjacent to the top of said wall, and said splice and first support means further including resilient biasing means extending deflected intermediately of said web of said splice support structure and said splice member web for supporting said splice member web while said splice member web is against said webs of said pair of coping members at least rearwardly of said forward raised web portion of said splice support structure and said front leg portions of said pair of coping members are engaged with said front leg portion of said splice support structure at least against upward movement of said pair of coping members forwardly in said coping structure and said rear leg portions of said pair of coping members and said rear leg portion of said splice support structure are engaged at least against upward movement of said pair of coping members rearwardly in said coping structure.

## Re. 28,871
## PROCESS AND APPARATUS FOR SPINNING STAPLE FIBERS

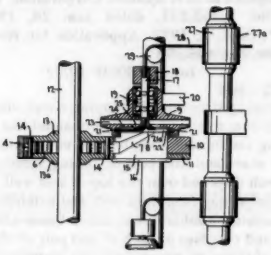
**Julius Meimberg, Muenster, and Clemens Schlösser, Bremen, both of Germany, assignors to Rieter Machine Works, Ltd., Winterthur, Switzerland**

**Original No. 3,324,642, dated June 13, 1967, Ser. No. 422,996, Jan. 4, 1965. Application for reissue Sept. 5, 1974, Ser. No. 503,465**

**Claims priority, application Germany, Jan. 8, 1964, 59477**

**Int. Cl.[2] D01H 1/12**

**U.S. Cl. 57—58.95** **19 Claims**



1. A process for spinning staple fibers comprising the steps of:

a. continuously delivering a sliver to a separation roller,

b. separating individual fibers from said sliver in said separation roller,

c. accelerating the individual fibers by means of an air current surrounding these individual fibers approximately to the peripheral velocity of the inner wall of a *quickly rotating* hollow body member prior to delivery of said individual fibers to said hollow body member,

d. then delivering said individual fibers approximately tangentially to the inner wall of [a] *the* quickly rotating hollow body member and forming thereat a fiber ring,

e. and axially withdrawing a yarn out of said fiber ring.

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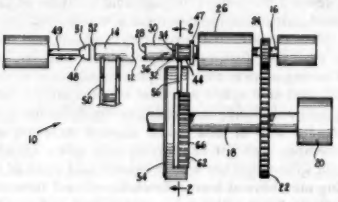
## Re. 28,872
## TRIMMING APPARATUS FOR TUBULAR BODIES

**Daniel J. Larkin, Seattle, and Robert L. Hunt, Bellevue, both of Wash., assignors to National Can Corporation, Chicago, Ill.**

**Original No. 3,838,653, dated Oct. 1, 1974, Ser. No. 353,401, Apr. 23, 1973. Application for reissue Feb. 21, 1975, Ser. No. 551,859**

**Int. Cl.[2] B21D 51/26**

**U.S. Cl. 113—7 R** **9 Claims**



1. Apparatus for trimming uneven edges from drawn and ironed tubular metal bodies, comprising:

two substantially parallel shafts including a body-turning shaft and a tool shaft, said body-turning shaft having a free end;

a body-supporting member concentrically attached to said body-turning shaft at said free end;

an annular cutter member mounted concentrically on said body-turning shaft axially inwardly of said body-supporting member, said cutter member having a circumferential surface with an edge closest to said free end of radial dimension less than said supporting member, said surface tapering outwardly from said edge to a cutter edge axially remote from said free end;

a knurling roller mounted on said body-turning shaft axially inwardly of and adjacent to said cutter member, said knurling roller having circumferentially spaced teeth each extending radially to a position radially inward of said cutter edge, said supporting member, cutter member and knurling roller having a constant, rigid overall axial dimension;

means to fully load a tubular body on said supporting member with said uneven edge extending over said knurling roller and to hold said body in fixed axial position during operations thereon;

a rotating wheel mounted on said tool shaft;

a blade circumferentially mounted on a first sector of said wheel and having a peripheral edge aligned to cooperate with said cutter edge to trim from a tubular body and endless ring of metal having said uneven edge; and

a knurling member circumferentially mounted on a second sector of said wheel, adjacent said first sector, and having a peripheral portion with radially extending teeth aligned to mesh with said knurling roller to break and knurl said endless ring, said teeth of said knurling member and roller being configured such that [the intersections of] all planes *extending through said knurling roller and knurling member, perpendicular to the axes of said knurling roller and knurling member and* normal to said shafts [with each individual tooth] are substantially congruent, and teeth on said knurling member closest said blade extend radially further than the remaining teeth thereon to mesh more deeply with said roller whereby to entrap and break said ring across its entire width.

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## Re. 28,873
## SCLERAL LENS WITH ATTACHED TUBE

**Loran B. Morgan, 138 Linda Vista, Torrington, Wyo. 82240**

**Original No. 3,664,340, dated May 23, 1972, Ser. No. 867,198, Oct. 17, 1969. Application for reissue May 13, 1974, Ser. No. 469,414**

**Int. Cl.[2] A61M 7/00**

**U.S. Cl. 128—249** **4 Claims**

*2. Apparatus for administering a continuously flowing supply of a liquid medicated solution to at least the corneal portion of a patient's eyeball, comprising:*

*a cup-like eye shield having a concave inner face of predetermined size and shape to overlie the frontal portion of the eyeball and having a smooth peripheral margin adapted to initially engage corresponding marginal portions of the eyeball;*

*the outer surface of the shield being adapted to contact the inner surfaces of the eyelids and maintain them separated from the eyeball;*

*the shield being provided with an inlet port extending therethrough to define a flow path for entry of liquid between the shield and the eyeball;*

*a length of flexible tubing having one end connected with the inlet port and an opposite end free for connection to the discharge end of a second length of tubing which is adapted to supply a medicated liquid from a suitable source of supply;*

*said free end being provided with an adapter; and*

*said adapter comprising a rigid hollow needle-like stem open at its ends, one open end being fitted communicatively into the bore of said free end, the other open end having a communicating socket member, said socket member being designed and adapted to receive the aforementioned discharge end.*

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**Re. 28,874**

## MOLDED BARREL

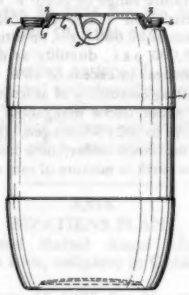
**Wilhelm Hammes, Munich, Germany, assignor to Mauser Kommanditgesellschaft, Cologne, Germany**

**Original No. 3,647,110, dated Mar. 7, 1972, Ser. No. 27,629, Apr. 6, 1970. Application for reissue Feb. 25, 1974, Ser. No. 445,680**

**Claims priority, application Germany, Apr. 23, 1969, 1920515**

**Int. Cl.² B65D *7/42***

**U.S. Cl. 220—72** **10 Claims**



1. A barrel of thermoplastic material comprising a circumferential wall; a pair of spaced end walls one of which has a general plane; at least two depressions in said one end wall at opposite diametric sides thereof; a tubular [projections] *projection* located in each depression and being of one piece with said one end wall, each of said tubular projections communicating with the interior of said barrel and terminating in said general plane; and reinforcing webs in the respective depressions at that side of the associated projection which faces the middle of said one end wall, said reinforcing webs being of one piece with said one end wall and the respective projection, *each reinforcing web having an upper section* connected to [said] *its respective* projection [only] within the upper region *of said respective projection.* [thereof so as to bridge the depression between said one end wall and the respective projection.]

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**Re. 28,875**

## MANUFACTURE OF THIN-WALLED CONTAINERS

**Lindsay Maitland Thomas, Chiswerth, England, assignor to Fairey Stainless Limited, Middlesex, England**

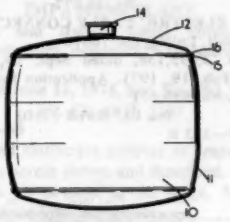
**Original No. 3,729,812, dated May 1, 1973, Ser. No. 204,250, Dec. 2, 1971. Application for reissue Aug. 16, 1974, Ser. No. 498,141**

**Claims priority, application United Kingdom, Dec. 2, 1970, 57247/70**

**Int. Cl.² B23K *31/02***

**U.S. Cl. 228—157** **23 Claims**

1. A method of making a double wall container comprising an inner vessel of thin walled stainless steel surrounded by a rigid outer vessel [in which the inner vessel is a thin-walled vessel of stainless steel], comprising the steps of forming two or more co-operating pieces of the inner vessel from sheet stainless steel and forming the mating edges to enable the pieces to be welded together in a manner which permits subsequent flattening, straightening or smoothing of the welded seams, welding an entry boss to one of the pieces, holding the pieces together in correct relationship and welding the pieces to form a liquid tight container, inserting the inner vessel in [said] *a larger* surrounding rigid outer vessel, and admitting fluid under pressure to the interior of the inner vessel to expand it [and cause it] to conform substantially to the internal shape of the outer vessel [.] *and to flatten, straighten, or*



*smooth* [thereby flattening, straightening or smoothing] to a substantial degree the welded seam or seams of the inner vessel, *the mating edge of at least one of the pieces being flanged outwards so that, in the area of the weld, the adjacent pieces are substantially parallel to each other, or make a small included angle, and the inner vessel being formed of two dome shaped pieces which are outwardly flanged at the rims and, after the rims are brought together, the two flanges are seam welded to give a liquid-tight joint.*

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**Re. 28,876**

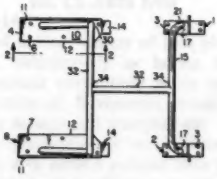
## ROLL BAR CAGE FOR VEHICLES

**Richard Lee Notestine, and Lee F. Coleman, both of Portland, Oreg., assignors to Richard Lee Notestine, Portland, Oreg.**

**Original No. 3,622,177, dated Nov. 23, 1971, Ser. No. 867,462, Oct. 20, 1969. Continuation of Ser. No. 263,163, June 15, 1972. Application for reissue July 17, 1974, Ser. No. 489,139**

**Int. Cl.² B60R *27/00***

**U.S. Cl. 280—756** **4 Claims**



1. In a vehicle having a body mounted upon a frame and comprising a forward section, a rearward section, and an operator's space between said sections, the rearward end of said front section defined by vertical vehicle body members interconnected by a dashboard, a framed windshield extending upwardly from the dashboard, and said rearward section having a downwardly opening wheel housing at each side thereof, the improvement comprising:

a flat plate secured to and extending along the top wall of each of said wheel housings on the interior of the vehicle body,

a roll bar cage comprising a first inverted U-shaped frame member secured at its bottom end to said vehicle frame,

said inverted U-shaped member extending upwardly and bearing forwardly against said windshield frame,

means fixedly securing said legs of said first U-shaped member to said rearward vertical ends of said forward section of the vehicle body,

a second roll bar frame of inverted U-shape coextensive in height and width with said first roll bar and secured at its bottom ends to said flat plates of said wheel housings,

said second roll bar reinforced by rearwardly extending right-angular members welded one each to each leg of said second roll bar and to said flat plates, and

a forwardly and rearwardly extending reinforcing bar welded at its forward end to said first roll bar and at its rearward end to said second roll bar.

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**Re. 28,877**

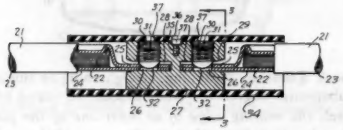
## ELECTRIC CABLE CONNECTOR

**John R. Pertuit, Luling, La. 70070**

**Original No. 3,693,138, dated Sept. 19, 1972, Ser. No. 116,761, Feb. 19, 1971. Application for reissue Sept. 6, 1974, Ser. No. 503,671**

**Int. Cl.[2] H01R *13/50***

**U.S. Cl. 339—213 R** **5 Claims**



**1. An electric cable connector for connecting electric cables of the type having a lug secured to the end thereof with the lug having a flat tongue extending outwardly therefrom and a transverse bore extending through the tongue comprising an elongate conductive body, transverse generally flat slots formed in opposite ends of said body and extending transversely thereacross to receive the tongues of the lugs said slots having flared outer ends for guiding said tongues on inserting said tongues in said slots, a pair of set screws threaded in said body for clamping said tongue in said slot, said set screws having domed inner ends for engagement in the transverse bores of said tongues, a generally cylindrical insulating sleeve encompassing said body and said lugs, and set screw means for locking said sleeve to said body.**

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**Re. 28,878**

## HIGH-STRENGTH LOW-ALLOY STEELS

**Michael Korchynsky; John David Grozier; John L. Mihelich, all of Bethel Park, Pa.; John R. Bell, Grosse Isle, Mich., and Leon Luyckx, McMurray, Pa., assignors to Jones & Laughlin Steel Corporation, Pittsburgh, Pa.**

**Original No. 3,666,452, dated May 30, 1972, Ser. No. 842,345, July 16, 1969. Application for reissue Nov. 11, 1974, Ser. No. 522,527**

**Int. Cl.[2] C22C *38/06, 38/12*; C21D *7/14***

**U.S. Cl. 75—123 E** **6 Claims**

**1. A killed, low-alloy high-strength steel hot-rolled finished in the temperature range 1550° F. to 1650° F., cooled at a rate within the range 20° F. to 135° F. per second, and collected within a temperature range of 1025° F. to 1175° F., the steel being characterized in a hot-rolled condition by a yield strength in excess of 80,000 p.s.i., an ultimate tensile strength in excess of 95,000 p.s.i., ductility as measured by percent elongation (2 inches) in excess of 18%, and good toughness, said steel consisting essentially of at least about .12% carbon, a maximum of about 1.65% manganese, at least about .05% vanadium, .005% to .025% nitrogen, .04% maximum phosphorus, .025% maximum sulfur, .60% maximum silicon, .01% to .10% of a rare earth or mixture of rare earths, balance iron.**

# PLANT PATENTS

## GRANTED JUNE 22, 1976

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

### 3,916
### YELLOW CHRYSANTHEMUM

Cleveland Ott, 677 Grater Ave., Graterford, Pa. 19426

Filed Mar. 6, 1975, Ser. No. 555,975
Int. Cl. A01h 5/00
U.S. Cl. Plt.—78 1 Claim

1. A new and distinct variety of yellow chrysanthemum, substantially as illustrated and described, characterized particularly by: a deeper hue of yellow color in the blossom relative to the parent Yellow Paragon chrysanthemum; petals of the blossom which maintain an incurving form during the entire flowering period; and a bloom which appears three days later than the parent Yellow Paragon chrysanthemum.

### 3,917
### POINSETTIA PLANT

Alexander Hrebeniuk, 7 Corner Road, Perkasie, Pa. 18944

Filed Mar. 20, 1975, Ser. No. 560,227
Int. Cl. A01h 5/00
U.S. Cl. Plt.—86 1 Claim

1. A new and distinct variety of poinsettia plant substantially as illustrated and described, characterized particularly as to novelty by its compact growth, self-branching habit, non-drooping foliage, and its ability to maintain its beauty and life at a temperature range of 50° F. to 60° F.

### 3,918
### IMPATIENS PLANT

Claude Hope and Rafael Angel Montoya Murillo, Cartago, Costa Rica, assignors to Goldsmith Seeds Inc., Gilroy, Calif.

Filed June 16, 1975, Ser. No. 587,091
Int. Cl. A01h 5/00
U.S. Cl. Plt.—68 1 Claim

1. A new and distinctive cultivar of *Impatiens sultani*, substantially as herein shown and described, characterized particularly as to novelty by its large, highly double flowers and distinct brilliant solid orange color.

### 3,919
### IMPATIENS PLANT

Claude Hope and Rafael Angel Montoya Murillo, Cartago, Costa Rica, assignors to Goldsmith Seeds Inc., Gilroy, Calif.

Filed June 16, 1975, Ser. No. 587,092
Int. Cl. A01h 5/00
U.S. Cl. Plt.—68 1 Claim

1. A new and distinctive cultivar of *Impatiens sultani*, substantially as herein shown and described, characterized particularly as to novelty by its large, highly double flowers and distinct bright clear red color.

### 3,920
### IMPATIENS PLANT

Claude Hope and Rafael Angel Montoya Murillo, Cartago, Costa Rica, assignors to Goldsmith Seeds Inc., Gilroy, Calif.

Filed June 16, 1975, Ser. No. 587,261
Int. Cl. A01h 5/00
U.S. Cl. Plt.—68 1 Claim

1. A new and distinctive cultivar of *Impatiens sultani*, substantially as herein shown and described, characterized particularly as to novelty by its large, highly double flowers and distinct white with a faint pink blush color.

### 3,921
### IMPATIENS PLANT

Claude Hope and Rafael Angel Montoya Murillo, Cartago, Costa Rica, assignors to Goldsmith Seeds Inc., Gilroy, Calif.

Filed June 16, 1975, Ser. No. 587,381
Int. Cl. A01h 5/00
U.S. Cl. Plt.—68 1 Claim

1. A new and distinctive cultivar of *Impatiens sultani*, substantially as herein shown and described, characterized particularly as to novelty by its large, highly double flowers and distinct light pink color.

### 3,922
### IMPATIENS PLANT

Claude Hope and Rafael Angel Montoya Murillo, Cartago, Costa Rica, assignors to Goldsmith Seeds Inc., Gilroy, Calif.

Filed June 16, 1975, Ser. No. 587,438
Int. Cl. A01h 5/00
U.S. Cl. Plt.—68 1 Claim

1. A new and distinctive cultivar of *Impatiens sultani*, substantially as herein shown and described, characterized particularly as to novelty by its large, highly double flowers and distinct two-tone coral pink color.

### 3,923
### ROSE PLANT

Jan Andries Herholdt, Roselandia, Eikenhof, Transvaal, Republic of South Africa

Filed June 20, 1975, Ser. No. 588,942
Int. Cl. A01h 5/00
U.S. Cl. Plt.—14 1 Claim

1. A new and distinct variety of rose plant of the hybrid tea class, substantially as herein described and shown, characterized particularly as to novelty by the unique combination of a vigorous growing plant with disease resisting foliage and exceptionally free flowering nature and the production of well formed extra large scented flowers, with perfect pointed buds borne on long rigid stems which hold the flowers upright, said flowers having the ability to retain their color and beauty in hot sun as well as in rainy weather.

### 3,924
### ROSE PLANT

O. L. Weeks, 926 W. Philadelphia, Ontario, Calif. 91762

Filed June 24, 1975, Ser. No. 589,867
Int. Cl. A01h 5/00
U.S. Cl. Plt.—21 1 Claim

1. A new and distinct variety of rose plant of the hybrid tea class, substantially as herein shown and described,

characterized particularly as to novelty by the unique combination of an attractive plant habit which is particularly attributable to its good height, density and compact canes which make it an ideal and useful garden rose plant; a distinctive blackish-red flower color, with the inside petals having a very velvety sheen and texture; and a distinctive and exceptionally heavy, sweet rose perfume flower fragrance which is quite often totally absent in many new rose varieties.

**3,925**

**PLUM TREE**

**Claron O. Hesse, Kingsburg, Calif., assignor to The Regents of the University of California, Berkeley, Calif.**

**Filed July 7, 1975, Ser. No. 593,391**

**Int. Cl. A01h** *5/03*

**U.S. Cl. Plt.—38** **1 Claim**

1. The new and distinct variety of plum tree herein described and illustrated, and identified by the characteristics enumerated above.

# PATENTS

## GRANTED JUNE 22, 1976

### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| 250–468 | 3,964,107 |
| 017–032 | 3,964,114 |
| 029–182 | 3,964,145 |
| 074–471 R | 3,964,318 |
| 030–381 | 3,964,333 |
| 090–011 C | 3,964,367 |
| 242–007.22 | 3,964,522 |
| 043–021.2 | 3,964,706 |
| 239–662 | 3,964,714 |
| 241–007 | 3,964,715 |
| 241–028 | 3,964,716 |
| 241–071 | 3,964,717 |
| 241–079 | 3,964,718 |
| 241-101.7 | 3,964,719 |
| 241–186 | 3,964,720 |
| 242–018 PW | 3,964,721 |
| 242–018 PW | 3,964,722 |
| 242–035.5 A | 3,964,723 |
| 134–117 | 3,964,926 |
| 060–039.32 | 3,965,066 |
| 526–154 | 3,965,078 |
| 526–068 | 3,965,079 |
| 526–183 | 3,965,080 |
| 526–009 | 3,965,081 |
| 526–019 | 3,965,082 |
| 526–065 | 3,965,083 |
| 424–279 | 3,965,274 |
| 424–279 | 3,965,275 |
| 178–007.3 D | 3,965,299 |

# PATENTS

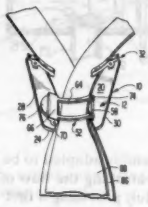
## GRANTED JUNE 22, 1976

## GENERAL AND MECHANICAL

### 3,964,105
### KNOT SIMULATOR

Thomas R. Gideon, P.O. Box 399, Aztec, N. Mex. 87410

Filed Mar. 24, 1975, Ser. No. 561,425
Int. Cl.² A41D *25/14*
U.S. Cl. 2—152 R 1 Claim



1. A decorative necktie knot simulator for use with a necktie having first and second tie panels, the simulator comprising:

a shield of generally inverted triangular form having angularly related straight side portions connected together at a central bend section and extending therefrom at obtuse angles each of said side portions having inner and outer surfaces;

the shield having a top edge and a bottom edge, the top edge being elongated in relation to the bottom edge;

an upper clip assembly on the inner surface of each of the side portions adjacent the top edge of the shield;

each upper clip assembly comprising a pair of upstanding legs fixedly secured to the side portion, a pivot axle between said legs, a clip arm having an inwardly extended elongated gripping section and an outwardly extended lever section pivotally mounted on said axle between said gripping and lever sections, and a coil spring about the axle having spring ends contacting the lever section and the inner surface of the shield and constantly urging the gripping section against the shield;

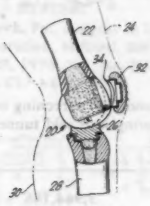
a lower main clasp assembly comprising a concave/convex plate fixedly secured to the inner surfaces of the shield side portions adjacent the bottom edge with the convex portion thereof in contact with the shield inner surface, the plate having a pivot end and a free end, a clasp member having a cross bar pivoted on said pivot end of the plate, an actuating knob extending from the cross bar, a pair of elongated, curved retaining bars extending from the cross bar across the shield, the retaining bars each having an outer lip which extends about the free end of the plate, and coil springs about the pivot end of the plate with spring ends contacting the shield inner surface and the actuating knob to urge the retaining bars against the plate; and

the tie panels being positioned in knot simulating, superposed positions with the first and second tie panels in overlapping relation, one of the upper clip assemblies engaging each of the sections, and the lower clasp engaging the superposed tie panels.

### 3,964,106
### THREE-PART TOTAL KNEE PROSTHESIS

Charles G. Hutter, Jr., and Luigi Gentile, both of North Hollywood, Calif., assignors to Physical Systems, Inc., North Hollywood, Calif.

Filed Mar. 3, 1975, Ser. No. 554,484
Int. Cl.² A61F *1/24*
U.S. Cl. 3—1.911 5 Claims



1. A knee prosthesis which includes:

a femoral cap having a proximal surface adapted to bear against the cortex of the femur to transmit the load carried by the femur to the cap, and a distal surface having a plurality of curvatures, said cap having a vertical groove in its anterior surface;

a tibial plateau having a distal surface adapted to bear against the cortex of the tibia, with a boss extending away from said femur and toward said tibia for attachment to the latter, and having a proximal surface adapted to cooperate with the distal surface of said femoral cap, said proximal surface of said plateau having a central curved surface having a radius of curvature less than that of the adjacent proximal surface, said curvature of said femoral cap and said tibial plateau being coordinated so that the tibia rotates about a constant center when flexing, and the difference between said central and adjacent radii of curvature of said tibial plateau effects a limiting stop when said tibia is extended; and

a patellar block adapted to be mounted on the posterior of the patella, the posterior surface of said block being curved to cooperate with the adjacent surface of said femoral cap, and having a vertically extending cusp fitting into said vertical groove of said femoral cap.

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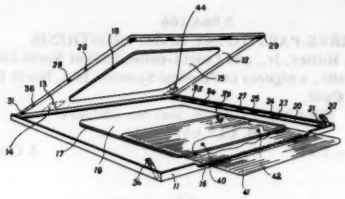
### 3,964,107
### RADIOGRAPHIC FILM CASSETTE

Emile Frans Stievenart, Hoboken; Leo Paul Van Bouwel, Mortsel, and Hendrik Sylvester Plessers, Boechout, all of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Division of Ser. No. 319,062, Dec. 27, 1972, Pat. No. 3,836,783. This application Apr. 1, 1974, Ser. No. 456,859
Claims priority, application United Kingdom, Dec. 29, 1971, 60344/71
Int. Cl.² G11B *1/00*
U.S. Cl. 250—468 8 Claims

1. An apparatus for unloading under daylight conditions radiographic sheet film cassets of the type having exteriorly projecting cocking levers at their side into a processing apparatus having an entrance slot, comprising a tunnel in communication with said entrance slot for the reception of said cassette, a resilient strip disposed in said tunnel extending substantially over the tunnel width, said strip being fixed along one edge on the tunnel and projecting at the opposite free end into the interior of the tunnel in the path of said cassette

locking levers for engagement with said levers as said cassette is introduced into said tunnel to open said cassette for the removal of the exposed film from the cassette and delivery to



said entrance slot and light screening means to prevent ambient light from entering into said tunnel after said cassette is introduced therein.

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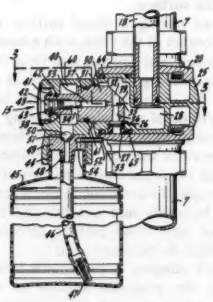
**3,964,108**

## DEOSEPTIC ASSEMBLY FOR BEDPAN RINSER

**Frederic Lissau, Chicago, Ill., assignor to Sloan Valve Company, Franklin Park, Ill.**

**Filed Nov. 20, 1974, Ser. No. 525,357**
**Int. Cl.² A47K 3/22, 11/08**
**U.S. Cl. 4—7** **16 Claims**



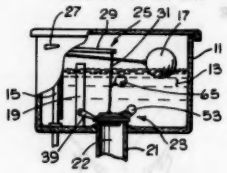
1. In combination, a flush valve together with a bedpan rinsing apparatus, a flush tube connecting said flush valve and a toilet fixture whereby operation of said flush valve causes water to flow into the toilet fixture, a diverter valve assembly supported on said flush tube, said assembly including a valve member rotatable therein, and having a spray arm attached to said valve member, said spray arm movable into and out of position with respect to said bedpan, said diverter valve member rotatable with said spray arm and having a flow passage therein arranged to permit water flow from said flush tube into said spray arm in one position of said spray arm, and to close off water flow in another position of said spray arm, a deoseptic assembly supported upon said diverter valve member and having a part rotatable therewith, said deoseptic assembly including a container of sanitizing liquid, means in said diverter valve responsive to movement of said spray arm into bedpan rinsing position and operation of said flush valve for causing water flow into the toilet fixture and into said spray arm, and means in said rotatable part of said deoseptic assembly responsive to said water flow for causing the sanitizing liquid in said container to mix with the water flow passing through said spray arm.

**3,964,109**

## FLUSH VALVE ASSEMBLY

**William M. Street, P.O. Box 225, Vancouver, Wash. 98660, and David L. Edmonds, 457 SW. Washington No. 5, Corvallis, Oreg. 97330**

**Filed June 11, 1974, Ser. No. 478,205**
**Int. Cl.² E03D 1/34, 5/02; A61B 19/00**
**U.S. Cl. 4—67 A** **7 Claims**



1. A flush valve assembly adapted to be operated by a valve opening means for controlling the flow of a fluid from a tank having an outlet conduit providing a first valve seat, the flush valve assembly comprising:

a first valve element heavier than an equivalent volume of the fluid cooperating with the first valve seat formed by the conduit to control flow of the fluid into the conduit, said first valve element defining
a passage therethrough and
a second valve seat;

a second valve element heavier than an equivalent volume of the fluid cooperating with said second valve seat formed by said first valve element to control flow of the fluid into said passage in said first valve element;

means for mounting said first valve element in the flush tank for pivotal movement between a closed position in which said first valve element seats against the first valve seat to inhibit the flow of the fluid through the conduit and an open position in which said first valve element is spaced from the first valve seat to facilitate flow of the fluid into the conduit;

means for mounting said second valve element on said first valve element for pivotal movement of said second valve element between a closed position in which said second valve element seats against said second valve seat to inhibit flow of the fluid into said passage and an open position in which said first valve element is spaced from the first valve seat to permit the flow of the fluid into said passage;

a valve opening means attached to said second valve element and being operable to selectively move said second valve element to the open position thereof to permit a first volume of the fluid to flow into the conduit, and being operable to selectively move said first valve element to open position thereof to permit a second volume of the fluid greater than the first volume of the fluid to flow into the conduit,

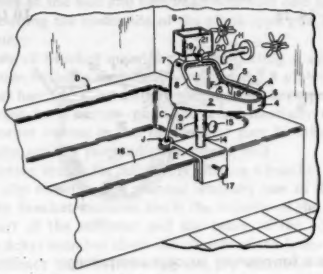
a first float operatively attached to said second valve element and having characteristics for assuming a location above said second valve element, at least when the tank is full of the fluid, and for descending with the fluid in the tank to permit movement of said second valve element from the open position thereof to the closed position thereof; and

a second float adapted for attachment to said first valve element and having characteristics for assuming a location above said first valve element at least when the tank is full of the fluid and for descending with the reducing level of the fluid in the tank to thereby permit movement of said first valve element from the open position thereof to the closed position thereof.

## 3,964,110
## PORTABLE UNISEX URINAL

Wynn Kapit, 2452 15th St., San Francisco, Calif. 94114

Filed June 18, 1975, Ser. No. 587,832
Int. Cl.² A47C 29/00
U.S. Cl. 4—99 3 Claims



1. A portable unisex urinal comprising:
a. a urinal bowl having an outlet;
b. adjustable means supporting said bowl and connecting it to a fixture having a drain;
c. a drain tube communicating with the outlet for said bowl and extending to the drain for conveying any liquid in the bowl to the drain;
d. said urinal bowl having a rim;
e. a perforated hose extending around the interior of the bowl and adjacent to the rim; and
f. a water containing reservoir removably supported by said bowl and having an outlet valve connectible to said hose;
g. whereby said valve may be opened for feeding water from said reservoir into said hose, the perforations in said hose directing the water against the inner surfaces of said bowl for flushing the bowl.

## 3,964,111
## URINE CONDUCTING APPARATUS

Paul R. Packer, 140 Lockwood Ave., New Rochelle, N.Y. 10801

Filed Jan. 7, 1975, Ser. No. 539,164
Int. Cl.² E03D 13/00
U.S. Cl. 4—110 7 Claims

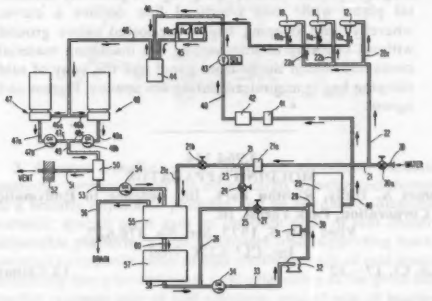
1. Urine conducting apparatus for use by females comprising an outer portable urine conductor having a tapered body with a wide inlet mouth at one end contoured to fit against and envelop the female perineum and having a narrow spout at the other end to direct the urine outlet flow, said conductor also having a thickened rim around its inlet mouth and its tapered body being made of thin pliable plastic material foldable around the rim when the conductor is not in use, and a thin portable and disposable liner of water repellent material having the same size and configuration as the interior surface of said conductor to removably fit within and substantially entirely cover the interior surface of said conductor, said liner being sturdy enough to help support said conductor body in extended condition when inserted within the conductor during use thereof.

5. A urine conductor for use by females comprising a tapered body having a wide inlet mouth region at one end contoured to fit snugly against and envelop the female perineum and having a narrow spout at the other end to direct the urine outlet flow, and a thickened rim around said inlet mouth edge containing internal metal spring means for providing a stiffening outward spring bias to said rim, whereby said rim presses tightly against the legs of a user to support said conductor when inserted within her crotch.

## 3,964,112
## DENTAL CUSPIDOR WITH FLUID RECIRCULATION SYSTEM

Richard E. Plowman, York, Pa., assignor to Dentsply Research & Development Corporation, Milford, Del.

Filed May 27, 1975, Ser. No. 581,059
Int. Cl.² A61C 17/04
U.S. Cl. 4—262 6 Claims

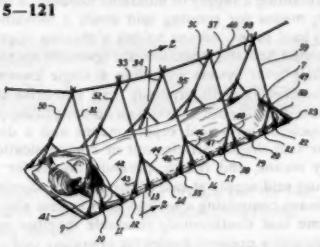


1. A fluid system comprising:
a. a cuspidor;
b. a fresh water supply for the cuspidor;
c. vacuum means for removing wastewater from said cuspidor;
d. a vacuum pump for said vacuum means;
e. means for rendering said wastewater reuseable;
f. means for passing said wastewater into the vacuum pump while bypassing said cuspidors whereby said vacuum pump is continuously maintained in a primed condition during operation.

## 3,964,113
## SLEEPING BAG SUSPENSION SYSTEM

Leslie Byron Dean, II, 5125 Williams Fork Trail No. 108, Boulder, Colo. 80301

Filed Jan. 9, 1975, Ser. No. 539,791
Int. Cl.² A45F 3/22; A41G 9/00
U.S. Cl. 5—121 5 Claims



1. A light weight compactly storable suspension system for supporting a sleeping bag above ground, said sleeping bag

having a top panel and a bottom panel, said system comprising:

a. webbing means attached in proximity to the upper surface of the bottom panel of said sleeping bag and oriented transverse to said sleeping bag for supportingly transmitting a load placed upon the bottom panel without compressing the bottom panel, said webbing means being of resiliently flexible material to permit general conformation of the bottom panel to the occupant of said sleeping bag and reduce the width of said sleeping bag during occupancy;

b. a tab disposed at each end of said webbing means for transmitting an external supporting force to each of said webbing means, said tabs being of a length sufficient to extend external to the respective side of said sleeping bag;

c. an overhead line for supporting said sleeping bag;

d. a plurality of pairs of load bearing lines depending from said overhead line at spaced intervals therealong for interconnecting said tabs with said overhead line, each said pair of load bearing lines being of a predetermined length to position said sleeping bag in a generally horizontal plane while said overhead line defines a curve; whereby, said sleeping bag is supported above ground without crushing or compacting the insulating material contained within the bottom panel and the sway of said sleeping bag is minimized during occupancy, ingress and egress.

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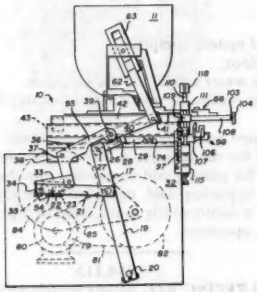
**3,964,114**

## MOLDING APPARATUS

**James A. Holly, Richton Park, Ill., assignor to Hollymatic Corporation, Park Forest, Ill.**

**Filed July 5, 1973, Ser. No. 376,627**
**Int. Cl.² A22C 7/00**
**U.S. Cl. 17—32** **12 Claims**



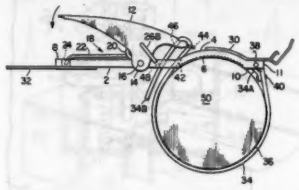
1. High capacity molding apparatus, comprising: supply means for retaining a supply of moldable material; a rotatable drive shaft; means for rotating said shaft; a movable mold adjacent to said supply means having a shaping opening for forming shaped articles; continuously operable means comprising a first lever system including a single continuously rotatable member extending radially from said drive shaft for moving said mold in a path between an opening filling position in communication with said supply means and a discharge position for said shaped articles out of communication with said supply means, and return; pressure means for forcing material from said supply at said filling position; continuously movable means comprising a second lever system also including the same said continuously rotatable member operable through successive pressure cycles for operating said pressure means; and means including said continuously rotatable member for operating said mold moving means out of time phase with said pressure operating means for initiating said mold movement prior to the completion of a said pressure cycle.

**3,964,115**

## ADJUSTABLE JAR CAP ROTATOR INCLUDING IN COMBINATION CAN PERFORATOR AND BOTTLE OPENER

**Stanley F. Platek, 187 Maplewood Ave., Maplewood, Essex County, N.J. 07040**

**Filed Aug. 26, 1974, Ser. No. 500,462**
**Int. Cl.² B67B 7/44**
**U.S. Cl. 7—14.25** **10 Claims**



1. A device for rotating jar caps comprising:

a base having an arcuate member at one end thereof with serrations on the underside of said member for engaging at least a portion of the jar cap;

a handle pivotally supported intermediate its ends by the base and extending toward the opposite end thereof;

means for biasing the handle away from the base at said opposite end;

a flexible member of indeterminant length having one end secured to the base at the end thereof having the arcuate member, and having another free end threaded through the base and handle adjacent said arcuate member and forward of said pivotal support for forming a loop adjustable in accordance with the periphery of the jar cap;

the flexible member having a friction surface for engaging at least part of the periphery of the jar cap and being drawn taut thereabout upon operator-operation of the handle toward the base in opposition to the biasing means; and

the friction surface of the flexible member and the arcuate serrated member cooperating to grip the jar cap, with operator twisting of the device being effective for rotating said cap.

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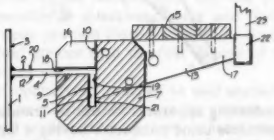
**3,964,116**

## SCAFFOLD SUPPORTING DEVICE

**Don Black, 1256 E. 13th St., Brooklyn, N.Y. 11230**

**Filed Aug. 7, 1975, Ser. No. 602,637**
**Int. Cl.² E04G 3/04**
**U.S. Cl. 9—1.7** **2 Claims**



1. A scaffold supporting device for a ship's hull having bulkheads, stiffeners affixed to and extending from the inside surfaces of the hull and from the bulkheads, each stiffener comprising a plank-type part affixed to the hull and bulkheads and a ledge part extending downward from the free edge of the plank-type part, said scaffold supporting device comprising

a pair of clip members, each comprising a plate-type member of substantially rectangular configuration having a substantially rectangular corner cutout forming a pair of substantially perpendicular edges and a channel formed therein and extending substantially perpendicularly to one of the edges and substantially linearly with the other of the edges for accommodating the ledge part of a stiffener of the hull and bulkhead with said one of the edges abutting the underside of the plank-type part of the stiffener;

a pair of bracket members for supporting a scaffold platform between them, each comprising a plate-type member having a substantially rectangular part tapering downward to a narrow part and a substantially rectangular corner cutout in the rectangular part forming a pair of substantially perpendicular edges; and

fastening means for releasably affixing a bracket member to a clip member in a manner whereby one of the edges of the bracket member abuts the topside of the plank-type part of the stiffener and the other of the edges of the bracket member abuts the outside of the ledge part of the stiffener thereby securing the clip members to the stiffener.

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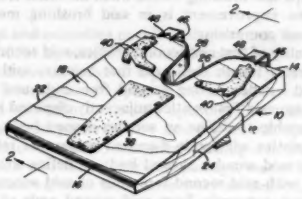
**3,964,117**

## COMBINED BOOT JACK AND SHAPER

**Dale H. Fox, 10218 Eden Court, NE., Albuquerque, N. Mex. 87112**

**Filed Apr. 7, 1975, Ser. No. 565,661**
**Int. Cl.² A43D *5/00*; A47J *51/02***
**U.S. Cl. 12—120.5** **8 Claims**



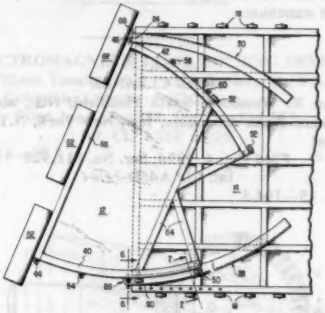
1. A combined boot jack and shaper including a generally horizontal panel member having upper and lower surfaces and a first pair of opposite marginal edge portions interconnected at corresponding ends by a second pair of opposite marginal edge portions extending therebetween, one edge portion of said first pair of marginal edge portions having an edgewise outwardly opening generally U-shaped notch formed therethrough intermediate and spaced inwardly of said second pair of edge portions and adapted to seatingly receive the heel portion of a boot therein with the toe portion of the boot projecting outwardly of said one edge portion, said one edge portion of said panel member, on opposite sides of said notch, including means defining a pair of abutment surfaces spaced above and facing downwardly toward the portions of said upper surface disposed therebeneath, said boot jack and shaper being free of obstructions between at least the marginal portions of said downwardly facing surfaces adjacent the other edge portion of said first pair of marginal edge portions and said upper surface and the spacing between said downwardly facing abutment surfaces and the opposing portions of said upper surface being slightly greater than the thickness of the toe portion of the sole of a conventional pair of boots, whereby the forward extremities of the soles of a pair of boots may be received between said downwardly facing abutment surfaces and said upper surface with the heel portions of the boots resting upon said upper surface to prevent upward curling of the forward sole portions of said boots.

**3,964,118**

## CARGO TRANSFER VEHICLE WITH DOUBLE ANGLE CATWALK ADJUSTMENT

**Henry W. Meyers, and John Quinby, both of Long Island City, N.Y., assignors to Marriott Corporation, Washington, D.C.**

**Filed Apr. 28, 1975, Ser. No. 572,510**
**Int. Cl.² B65G *11/00***
**U.S. Cl. 14—72.5** **12 Claims**



3. A cargo transfer vehicle having an elevatable platform assembly terminating at the outer cargo transfer end thereof in a linearly adjustable platform and an angularly adjustable catwalk; spaced pivot axes on opposite sides of said linearly adjustable platform; a pair of arcuate load supporting tracks secured to opposite sides of said platform; each of said tracks extending along arcs of equal radii originating at the pivot axis on the opposite side of said platform; spaced sets of bearing means mounted on said catwalk along arcs geometrically similar to said arcuate tracks; and means for selectively, pivotally interconnecting one side of said catwalk with one of said spaced pivot axes for effecting outward angular adjustment of the other side of said catwalk about said one pivot axis and along the arcuate track on the side of said platform opposite said one pivot axis.

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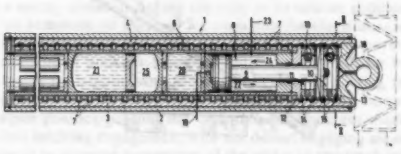
**3,964,119**

## SUPPORT LEG FOR BRIDGES

**Friedhelm Soffge, Kornwestheim, and Gerhard Albrecht, Illingen, both of Germany, assignors to Dr. -Ing. H.c.F. Porsche Aktiengesellschaft, Germany**

**Filed May 12, 1975, Ser. No. 576,443**
**Claims priority, application Germany, May 11, 1974, 2422895**
**Int. Cl.² E01D *19/02***
**U.S. Cl. 14—75** **18 Claims**



1. Support leg apparatus for bridges and the like, especially for portable bridges; said apparatus comprising:

housing means,

a stanchion disposed at said housing means for longitudinal movement with respect thereto,

stanchion length adjusting means for forcibly moving said stanchion longitudinally with respect to said housing means, said adjusting means including a movable member

and means for moving said movable member with respect to said housing means,

first locking means for selectively locking said stanchion in respective adjusted positions with respect to said housing means,

and second locking means for selectively locking said stanchion to said movable member,

wherein each of said first and second locking means are fluidly controlled and include locking members movable into and out of engagement with detent stop means of said stanchion.

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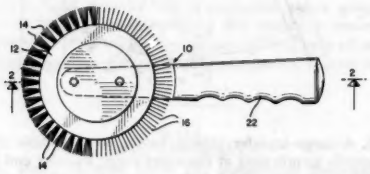
3,964,120

## COMB CLEANER

Thurman R. Woodford, South Plainfield, N.J., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Oct. 4, 1974, Ser. No. 511,928
Int. Cl.[2] A45D *24/44*
U.S. Cl. 15—104.5 2 Claims




1. A comb cleaning implement comprising: a generally circular planar member having bristle tufts extending radially from a plurality of points along one half of the circumference of said member and a plurality of tines extending radially from a plurality of points along the other half of the circumference of said member, an elongated handle extending radially of said member and mutally engageable fastener means carried by said member and said handle for securing said member to said handle selectively in either of two opposite angular orientations.

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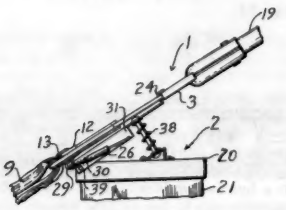
3,964,121

## MOP HOLDER AND BRUSH COMBINATION

Kwan Chi Kim, 133 Mauna Kea St., Hilo, Hawaii 96720

Filed Jan. 18, 1971, Ser. No. 107,291
The portion of the term of this patent subsequent to June 22, 1991, has been disclaimed.
Int. Cl.[2] A47L *13/12*
U.S. Cl. 15—115 3 Claims




1. A combination mop holder and brushing means comprising:

a. a mop holder of the open frame type with a handle attached to one end of the open frame and a mop attached to the other end of the open frame; and

b. a brushing means comprising:

1. a generally flat brush;

2. a generally flat base member;

3. a resilient biasing means operably connecting the base member and the brush; and

4. quick connect means fixed to the base member operably connecting the base member to the mop holder comprising two sets of hooking means, one set of which engages the handle end of the open frame, and the other set of which engages the mop end of the open frame, said quick connect means also comprises a spring means which constantly urges the latter set of hooking means towards and against the mop end of the frame.

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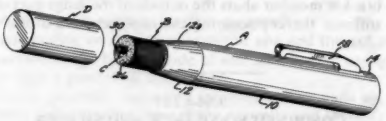
3,964,122

## DENTAL HYGIENE DEVICE

George Kurdy, 454 W. 6th St., Long Beach, Calif. 90802

Filed Oct. 15, 1974, Ser. No. 514,639
Int. Cl.[2] A46B *9/04, 17/04*
U.S. Cl. 15—184 1 Claim




1. A dental hygiene device of the type that includes an elongate solid handle that has first and second end portions, tooth brushing means supported from said first end portion, and a cap that is removably mounted on said first end portion and envelops said brushing means when the latter is not in use, wherein the improvement is in said brushing means, said improvement comprising:

a. a plurality of first and second bristles, said second bristles of greater length than said first bristles, said first and second bristles having second free ends and first end portions, said first bristles adjacently disposed in parallel relationship to define an annulus shaped body, said second bristles adjacently disposed in parallel relationship within said annulus shaped body to define a cylindrical body, with said second free ends of said second bristles disposed outwardly from said second ends of said first bristles a substantial distance, said first end portions of said first and second bristles disposed in a cavity in said first end of said handle and axially aligned with said handle; the said free ends of the first and second bristles terminating in spaced parallel substantially perpendicular to the length of the handle and

b. a body of bonding agent in said cavity that holds said first end portions of said first and second bristles together therein as an integral unit, said device when said cap is removed therefrom capable of being manually used to clean the teeth of a user when said second free ends of said bristles are brought into pressure rubbing contact therewith, with said second ends of said first bristles when said contact is so made contacting the exterior surfaces of the teeth, and said second ends of said second bristles as said contact is so made entering the spaces between said teeth to dislodge foreign material therefrom.

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3,964,123

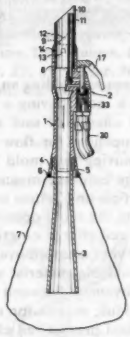
## DEVICE FOR A COMBINED SUCTION AND BLOW-OFF NOZZLE CONNECTABLE TO A SOURCE OF COMPRESSED AIR

Henry A. Pettersson, Kvarngatan 7, S-811 Sandviken, Sweden

Filed July 3, 1974, Ser. No. 485,533
Claims priority, application Sweden, July 13, 1973, 7309869
Int. Cl.[2] A47L *5/14*
U.S. Cl. 15—345 7 Claims

1. A combination suction and air blowing nozzle connectable to a source of compressed air comprising a tube shaped casing having open ends, a venturi nozzle being mounted on

one of said casing open ends, a valve housing being mounted on and extending through said casing, said valve housing having a compressed air inlet passage, at least two lateral openings, and a valve bore extending across said lateral openings to said air inlet passage, a tubular slide valve being closed at both ends and slideably extending in said housing valve bore, said slide valve having an opening positioned in a portion of said slide valve for communicating with said housing air inlet passage when said slide valve portion is in said air inlet passage and a pair of side openings each positioned for communicating with one of said valve housing lateral openings when aligned therewith during movement of said slide valve, a tube adjustably mounted in said valve housing in communication with one of said valve housing lateral



openings and extending in said casing towards the other end thereof for blowing air out of said casing other end when said tube is adjusted to a position opening its respective valve housing lateral opening and said slide valve is positioned with one of its side openings in communication with said respective valve housing lateral opening and said slide valve first mentioned opening is in communication with said housing air inlet passage, means for moving said slide valve in said valve bore as desired, and said valve housing having a passage communicating with the other of said valve housing lateral openings and extending in said casing towards said venturi nozzle whereby air from said valve housing passage will draw air in said casing other end creating a suction therein when said slide valve is positioned placing said valve housing passage in communication with said valve housing air inlet passage.

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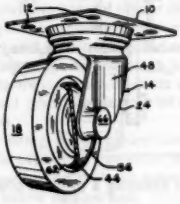
**3,964,124**

## SEALED CASTER

**Thomas A. Crawford, Jackson, Mich., assignor to Midwest-Precision Corporation, Jackson, Mich.**

**Filed Dec. 30, 1974, Ser. No. 537,101**
**Int. Cl.² B60B** *33/00*
**U.S. Cl. 16—21** **9 Claims**



**1. A sealed caster comprising, in combination, a body, support means for attaching said body to the caster supported** apparatus, said body including a pair of spaced legs, an axle supported on said legs extending therebetween, a wheel mounted intermediate said legs rotatably supported upon said axle and having opposite sides, a resilient seal coating mounted upon each of said legs adjacent said axle, said seal coating on each leg defining an annular flexible skirt portion extending toward said wheel having a peripheral edge engaging a side of said wheel to seal said axle adjacent said wheel.

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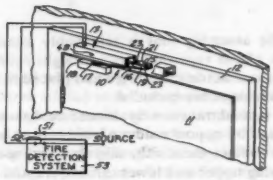
**3,964,125**

## ELECTROMAGNETIC DOOR HOLDING DEVICE

**Henry William Tansley, 602 - 1315 Cardero St., Vancouver, British Columbia, Canada (V6G 2J2)**

**Filed June 12, 1975, Ser. No. 586,253**
**Int. Cl.² E05F** *15/20*
**U.S. Cl. 16—48.5** **6 Claims**




**1. A door hold-open and closing assembly comprising:**

**a. a track adapted to be mounted horizontally to a door frame above a door, the track having detent engaging means,**

**b. an electromagnet in the track,**

**c. a slider mounted for free sliding movement along the track,**

**d. a spring-operated door closing device adapted to be mounted on the door and having a rotatable arm connected to the slider,**

**e. detent means mounted on the slider for movement into and out of latching engagement with the detent engaging means when the door is in its normal open position,**

**f. a moveable cam mounted on the slider operable between a latching and a release position for moving the detent means into and out of corresponding latching and release engagement with the detent engaging means,**

**g. a spring normally urging the cam to its release position,**

**h. an armature on the cam for engaging the electromagnet when the slider is moved a distance, passed the normal door open position, equal to the travel of the cam between its latching and release positions for holding the cam immovable when the door is returned to the normal open position so that the cam moves the detent means into latching engagement with the detent engaging means so as to prevent movement of the slider in the track and maintain the door in the open position against the action of the door closing device,**

**i. normally closed heat sensitive switch means in the electromagnet circuit for opening the circuit upon sensing of heat so as to de-energize the electromagnet to enable the spring to move the cam to its release position out of latching engagement with the detent means and allow the slider to move freely in the track so as to enable the door closing device to return the door to the closed position.**

3,964,126

## HANDLE ATTACHMENT FOR DRINKING WATER BOTTLE

Fred C. Madsen, 844 San Pablo St., Long Beach, Calif. 90813

Filed June 30, 1975, Ser. No. 591,780
Int. Cl.² B65D 63/18
U.S. Cl. 16—114 R 4 Claims

1. A handle assembly that is removably attachable to a carboy bottle of the type that has a straight cylindrical side wall to permit said bottle to be lifted and placed in an inverted position, which assembly includes:

a. first and second transversely arcuate rigid sheets that may be disposed on opposite sides of said carboy bottle and in abutting contact therewith, said first and second sheets each having upper and lower circumferential edges, said first sheet when said carboy bottle is in an upright position having vertical first and second edges that extend between said upper and lower circumferential edges thereof, and said second sheet having third and fourth vertical edges that extend between said upper and lower edges thereof;

b. first and second handles secured to said first and second sheets;

c. first, second, third and fourth pairs of pliable horizontal bands, said first and second pairs of bands connected to said first sheet and extending in opposite directions from said first and second edges thereof, said third and fourth pairs of bands connected to said second sheet and extending in opposite directions from said third and fourth edges thereof, said first and third pairs of bands having free ends that are separated by a first space, and said second and fourth bands having free ends that are separated by a second space;

d. a pair of first manually operable locking means connected to said free ends of said first and third pairs of bands and disposed in said first spaces, said first manually operable locking means capable of occupying first and second positions, said first manually operated locking means when in said first positions holding said free ends of said first and third pairs of bands a minimum distance from one another, and said first manually operable locking means when in a second position holding said free ends of said first and third pairs of bands in a maximum distance from one another; and

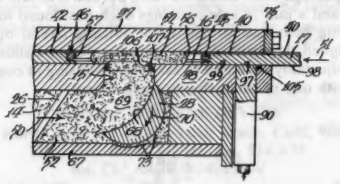
e. a pair of manually adjustable means connected to said free ends of said second and fourth pairs of bands disposed in said second spaces for so adjusting the lengths of said second spaces that when said first manually operable locking means are moved from said second to said first position said first and second sheets and said first, second, third and fourth bands are forced into pressure frictional contact with said cylindrical side wall to the extent said carboy bottle may be lifted by said first and second handles and disposed in an inverted position, and said first manually operable locking means when in said second position increasing the length of said second spaces that said handle assembly may be moved longitudinally relative to said cylindrical side wall of said carboy bottle to be mounted on or removed from the latter.

3,964,127

## MOLDING APPARATUS

Harry H. Holly, Olympia Fields, Ill., assignor to Hollymatic Corporation, Park Forest, Ill.

Filed Dec. 30, 1974, Ser. No. 537,400
Int. Cl.² A22C 7/00
U.S. Cl. 17—32 15 Claims



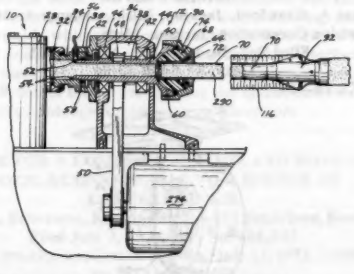
1. Apparatus for pressure molding an article from moldable material, comprising: a mold having a mold opening for receiving a pressurized charge of said material; an entrance means to said mold opening for flow therethrough of said material; means for moving said mold for movement of said mold opening from the entrance means to a location for removing the shaped article and return to the entrance means; an air vent means from the mold opening for venting air displaced by the pressurized charge entering the mold opening; an air valve in said air vent means movable between open and closed positions; a moldable material valve in said entrance means mounted for movement between entrance means opening and closing positions; means for opening said material valve for passage of said pressurized charge of material into the mold opening; means for closing said air valve when said mold opening is substantially filled with said moldable material and prior to said moving of said mold opening from said entrance means; and means for closing said material valve also when said mold opening is substantially filled with said pressurized charge and prior to said moving of said mold opening from said entrance means, the material in said mold opening thereby being held under pressure between the closed air valve and the closed material valve.

3,964,128

## APPARATUS FOR ENCASING A PRODUCT

Ray T. Townsend, and Donald L. Beasley, both of Des Moines, Iowa, assignors to Townsend Engineering Company, Des Moines, Iowa

Filed Dec. 14, 1972, Ser. No. 315,100
The portion of the term of this patent subsequent to Sept. 17, 1991, has been disclaimed.
Int. Cl.² A22C 11/00
U.S. Cl. 17—33 20 Claims



1. Apparatus for encasing a product comprising,

a support,

an elongated stuffing tube having a product receiving rearward end and a discharge forward end, said tube being rotatably mounted on said support for rotation about its longitudinal axis, said forward end of said stuffing tube

being adapted for protruding within and supporting a folded casing whereby rotation of said stuffing tube causes rotation of said folded casing;

means for introducing said product into said rearward end of said tube and for forcing said product out of said tube through said forward end into said casing; and

drive means for rotating said stuffing tube thereby imparting a rotation to said casing both before and after it is filled;

said stuffing tube being operatively selectively pivotally secured at its rearward end to said support, the forward end of said stuffing tube being movable at least upwardly from said support so that the folded casing may be slipped thereover.

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**3,964,129**

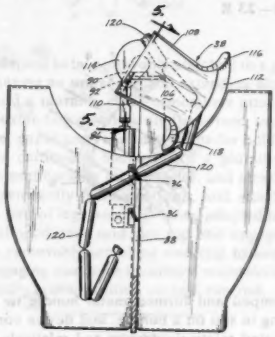
## APPARATUS FOR LOOPING AND CONVEYING AN ENCASED PRODUCT

**Ray T. Townsend, Des Moines, Iowa, assignor to Townsend Engineering Company, Des Moines, Iowa**

**Filed Mar. 27, 1974, Ser. No. 455,252**

**Int. Cl.² A22C *11/00***

**U.S. Cl. 17—33** **3 Claims**



1. Looping and conveying apparatus for use with means adapted to issue forth an elongated linked casing, said apparatus comprising;

a support,

a guide means pivotally movably mounted on said support adapted to move between first and second positions, said guide means having first and second ends and a central area extending therebetween for receiving and supporting said casing, said first end adapted to receive said casing,

a conveyor comprising a plurality of spaced apart casing supports thereon and also comprising carrying means for moving said casing supports along a predetermined path, said conveyor being positioned so that said casing supports will pass adjacent said second end of said guide means when being moved by said carrying means,

power means for moving said guide means between its first and second positions to cause said casing supports to catch said casing at spaced points along the length of said casing,

and selectively adjustable control means operatively connecting said carrying means and said power means to coordinate the movement of said guide means and said carrying means, so that said casing supports will catch and carry away said casing at predetermined spaced points along the length of said casing as said casing passes out of said second end of said guide means,

said guide means being a pan means comprising a bottom having side walls extending upwardly therefrom, said bottom being disposed in an inclined plane so that its second end is disposed below its first end,

a stub shaft operatively secured to said bottom of said pan means, said stub shaft being rotatably mounted on said support, an arm secured to said stub shaft and extending therefrom, said power means comprising an air cylinder operatively connected to said arm to pivotally move said pan means.

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**3,964,130**

## METHOD OF AND DEVICE FOR OPENING BIVALVULAR MOLLUSKS

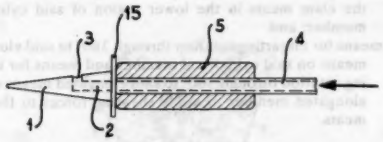
**Henri Bertrand, 20, rue d'Alsace-Lorraine, 45000 Orleans, France**

**Filed July 3, 1974, Ser. No. 485,581**

**Claims priority, application France, July 16, 1973, 73.25946**

**Int. Cl.² A22B *3/00***

**U.S. Cl. 17—45** **13 Claims**



1. A method of opening bivalvular mollusks, notably flat oysters (*Ostrea edulis*) and Portuguese oysters (*Gryphaea* or *Crassostrea angulata*), said method comprising:

providing an elongated member having a sharpened end and a passage extending longitudinally within said member, said passage opening at a first end thereof into an orifice on a lateral surface of said member;

introducing said member between the mollusk valves or shells; and

feeding compressed air through said passage and said orifice against one of said shells and releasing the mollusk muscle normally closing said mollusk, thereby forcing apart said mullusk shells.

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**3,964,131**

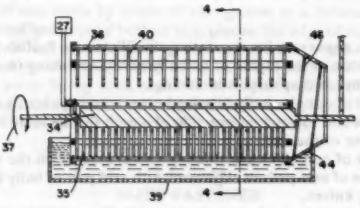
## METHOD AND APPARATUS FOR EVISCERATING CLAMS

**Harold F. Snow, Scarborough, Maine, assignor to Borden, Inc., Columbus, Ohio**

**Filed July 26, 1973, Ser. No. 382,836**

**Int. Cl.² A22C *21/00***

**U.S. Cl. 17—53** **22 Claims**



1. Method of treating clam meats comprising the steps of subjecting clam meats to a sufficient force applied at random points by multiple impacts to sever the connecting tissue between the various parts of a clam in order to partition the clam into its component parts of uneviscerated tongue, muscles, straps, siphons and occasional spines; separating the uneviscerated tongues from the remainder of clam parts to form a first product stream composed of uneviscerated tongues and a second product stream composed of remaining parts of a clam; removing viscera from the tongues by subjecting uneviscerated tongues to a sufficient shearing force applied at random points by multiple impacts to expel the viscera from the tongues;

9. Apparatus for treating clam meats comprising a cylindrical member having a lower region and said cylindrical member disposed substantially horizontally having an inlet and an outlet into which the clam meats are introduced through the inlet of said member;

plurality of elongated means extending inwardly from said cylindrical member for engaging the clam meats in the lower region of said cylindrical member;

an elongated member extending through said cylindrical member substantially parallel to its longitudinal axis but spaced from the longitudinal axis of said cylindrical member;

plurality of elongated means extending outwardly from said elongated member in intermeshing relationship with said elongated means on said cylindrical member for engaging the clam meats in the lower region of said cylindrical member; and

means for imparting rotation through 360° to said elongated means on said cylindrical member and means for imparting rotation through 360° to said elongated means on said elongated member to apply shearing forces to the clam meats.

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**3,964,132**

## APPARATUS FOR SEPARATING THE FILLETS OF A FLATFISH

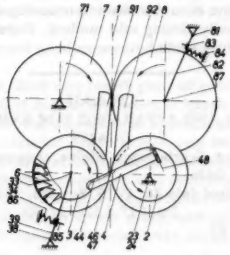
**Horst Backhaus, and Heinz Schroder, both of Lubeck, Germany, assignors to Nordischer Maschinenbau Rud. Baader, Lubeck, Germany**

**Filed Sept. 6, 1974, Ser. No. 503,714**

**Claims priority, application Germany, Oct. 9, 1973, 2350561**

**Int. Cl.² A22C *25/16***

**U.S. Cl. 17—57** **2 Claims**



1. An apparatus for separating the fillets of a flatfish from its skeleton in the region of its belly cavity and along its main backbone, said apparatus including

a pair of circular belly filleting knives rotating about a fixed axis and located on one side of a path for the main backbone of the fish,

a pair of curcular back filleting knives located on the other side of said path in alignment with said pair of belly filleting knives,

a first arm rotatably mounted on a fixed axis and rotatably mounting said back filleting knives thereon,

spring means biasing said first arm against an adjustable strip to locate said back filleting knives in an operative position closely spaced from said belly filleting knives,

a pair of backside conveyor disks on one side of said path downstream from said filleting knives, and rotating about two stationary axes,

a pair of belly side conveyor disks on the other side of said path in alignment with said backside conveyor disks, said belly side conveyor disks rotating about two axes supported by a second arm pivotable about a stationary axis and biased to an operating position against a second adjustable stop,

two pairs of backbone guides, one pair located on the belly side of said path beneath the outer surface of the belly filleting knives, and the other pair located on the opposite side of said path beneath the outer surfaces of the back filleting knives,

and a separating tool crossing said path at an oblique angle near the line connecting the centers of the backside and belly side conveyor disks, said separating tool including two rib scraping tools each having a scraping edge,

the lower edge of each pair of backbone guides entering between the two conveyor disks of a respective disk pair, and the backside conveyor disks and belly side conveyor disks being inclined towards one another to thereby define narrow gaps between the inner sides of a disk pair.

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**3,964,133**

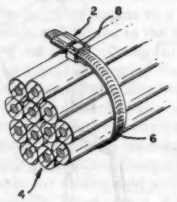
## BUNDLE TIE DEVICE

**Henry George Wasserlein, Jr., Seminole, Fla., assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed Sept. 21, 1973, Ser. No. 399,644**

**Int. Cl.² B65D *63/06***

**U.S. Cl. 24—23 R** **2 Claims**



1. A stamped and formed metal bundle tie device, said device being in situ on a bundle, said device comprising:

an elongated relatively narrow and relatively thin strip of sheet metal, said strip having a leading end and a trailing end,

a plurality of punched out slots in said strip, said slots extending transversely across said strip at equally spaced intervals, each of said slots having a central portion of reduced and uniform width and having enlarged ends proximate the sides of said strip, said central portion of each slot having two spaced apart transversely extending parallel edges, one of said edges being a leading edge and being proximate to said leading end of said strip and the other one of said edges being a trailing edge and being proximate to the trailing end of said strip,

said enlarged ends of each slot being circular, said ends extending from said leading edge rearwardly towards and past said trailing edge to a point between said trailing edge and the leading edge of the adjacent slot, said leading edge of each slot merging tangentially with said enlarged ends of each slot,

the sections of said strip between said enlarged ends of each slot being formed outwardly in one direction from the plane of said strip to provide a plurality of spaced apart vanes, all of said vanes extending from said strip on only one side of said strip, said vanes being substantially parallel, each of said vanes having an outer edge formed by the trailing edge of the associated slot and each of said vanes sloping toward said strip,

said leading end of said strip over-lapping said trailing end of said strip with said vanes proximate to said trailing end of said strip extending through said central portions of said slots proximate to said leading end, and said tangential leading edge of said slots proximate to said leading end bearing against said enlarged end portions of said slots proximate to said trailing end, at a location in said last mentioned slots between said trailing edge and

said leading edge of the adjacent slot whereby, said vanes and said slots are interlocked to form a bundle tie in which the vanes do not project inwardly where they might damage the conductors.

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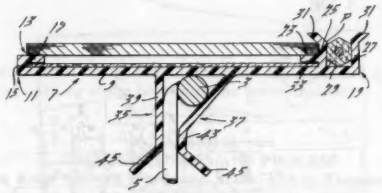
3,964,134

## GROCERY CART CLIP ATTACHMENT

Gary L. Newtson, 752 Robinhood Circle, Bloomfield Hills, Mich. 48013

Filed Mar. 10, 1975, Ser. No. 557,188
Int. Cl.² A44B *21/00*; B62D *39/00*
U.S. Cl. 24—81 PC 15 Claims



1. A clip adapted to be removably attached to a grocery cart of the type having an upper rim rod extending along the side of the cart and a plurality of wire members attached to said rim rod and extending downwardly therefrom, said clip comprising a base, paper pad retaining means for holding a paper pad having a cardboard backing and a plurality of sheets connected to said backing on said base, and attaching means extending downwardly from said base, said attaching means comprising a pair of legs, said legs being adapted to be spread apart to be slipped over said rim rod and engage said wire members for removably attaching said clip to said cart, said legs when engaging said wire members, maintaining said clip in a substantially stable position on said rim rod.

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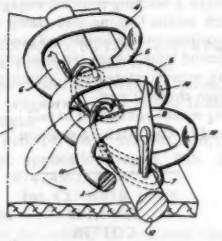
3,964,135

## SLIDE-FASTENER HALVES

Helmut Heimberger, Grenzach, Germany, assignor to Opti-Holding AG, Glarus, Switzerland

Division of Ser. No. 381,441, July 23, 1973, Pat. No. 3,884,168. This application May 31, 1974, Ser. No. 475,263
Claims priority, application Germany, July 21, 1972, 2235828
Int. Cl.² A44B *19/12*, *19/40*
U.S. Cl. 24—205.1 C 3 Claims



1. A slide-fastener half comprising:
an elongated stringer tape;
a monofilamentary coil supported on said tape, said coil having turns with lower shanks resting on said tape, upper shanks spaced from said tape and intervening coupling heads overhanging an edge of said tape;
a filler cord extending longitudinally through said coil; and
stitching securing said coil to said tape, said stitching consisting of loops of thread emerging at longitudinally spaced locations from the top of said cord and passing underneath said upper shanks approximately half-way around said cord to points between said cord and said tape, said loops being interliked at said points to form a chain stitch.

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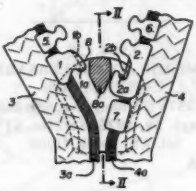
3,964,136

## SLIDING CLASP FASTENERS

Maria Luisa Panzeri, Via Vanvitelli 41, 20100 Milan, Italy

Filed Mar. 5, 1975, Ser. No. 555,635
Claims priority, application Switzerland, Mar. 8, 1974, 3335/74; Italy, May 13, 1974, 22630/74
Int. Cl.² A44B *19/00*
U.S. Cl. 24—205.14 R 3 Claims



1. In a zipper including two opposing flexible tapes, each having a row of interlockable teeth, and a channeled sliding clasp having a handpull and an inner wedge and adapted to lock and release said teeth, the improvement comprising: a three-piece automatic bottom stop attached to said tapes at one end of the row of interlockable teeth, and comprising a first bottom stop piece having a first-tape engaging side and a male member side, said male member side extending downwardly between the opposing tapes and in the path of the sliding clasp, a second bottom stop piece having a second-tape engaging side and a female member side comprising a cavity extending downwardly and being adapted to receive the male member in a hook lock, the upper end of said female member having a tooth shaped portion allowing this member to act as a continum of the row of zipper teeth, and a third bottom stop piece oblique parallelepiped form defining a pair of opposite parallelogram faces and including a tape engaging groove extending in the entire length of one of said parallelogram faces substantially at right angles to the base of the parallelepipedic piece, said third bottom stop piece being positioned on one of said tapes by means of said groove at a distance from said first and second bottom stop pieces, the edge of said third bottom stop piece extending between the lower acute angles of said parallelogram faces being bevelled, said third bottom stop piece being sized so as to be capable of fully passing through the channel in said sliding clasp during initial installation of said sliding clasp on said zipper tapes.

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3,964,137

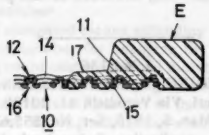
## SLIDE FASTENER

Toshiyuki Kihara, Kurobe, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed May 1, 1974, Ser. No. 465,997
Claims priority, application Japan, May 8, 1975, 48-51479
Int. Cl.² A44B *19/40*
U.S. Cl. 24—205.16 R 2 Claims

1. A slide fastener comprising a pair of oppositely disposed stringer tapes of a warp-knitted structure having wales and interstices between adjacent knitting threads and a series of discrete fastener elements made of a thermoplastic material attached to one longitudinal marginal edge of each of said stringer tapes, said fastener elements being secured to one surface of the tape and said marginal edge thereof in such a manner that the material of the fastener elements penetrates

into and through said interstices to fill the latter up and is extended further up to the region of the wales on the reverse




of the tape thereby forming an integral bond with the wales underlying said fastener elements.

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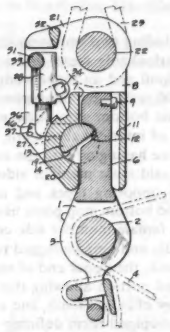
**3,964,138**

## LOCKING MEANS FOR RELEASABLE STRAP CONNECTORS

**Jack A. Gaylord, 12578 Nacido Drive, San Diego, Calif. 92128**

**Filed Sept. 29, 1975, Ser. No. 617,325**
**Int. Cl.² A44B *19/00***
**U.S. Cl. 24—230 A** **21 Claims**



**1.** In a releasable strap connector, a female member having a socket therein, and a male member having at least one prong fitting into said socket, said prong having a pocket therein, a rocking bar journalled in said female member intersecting said socket, means to position said prong so that said pocket faces said rocking bar at the intersection thereof, a portion of said rocking bar at the intersection being cutaway so as to leave said socket and said pocket unobstructed in one position of said rocking bar thereby to permit insertion and withdrawal of said prong, and in another position to project into said pocket thereby to interlock with said prong, and means for turning said rocking bar from interlocking position to unobstructing position at will,

the improvement of manipulatable means for rocking said rocking bar into and out of the interlocking position and means for locking said rocking bar, comprising

a handle lever connected to the rocking bar for rocking the same,

coacting guide elements between said female member and said handle lever guiding said handle lever between locking and releasing positions,

locking means related to said coacting guide elements to lock said handle lever in interlocking position,

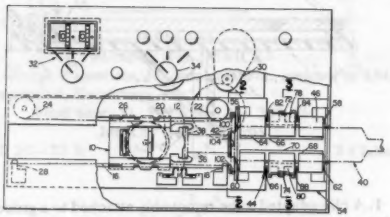
and resilient means to urge said coacting elements toward locking position.

**3,964,139**

## SYRINGE HOLDER

**Aaron Joseph Kleinmann, Lexington; Robert Leo Norton, Norfolk, and Morton Irving Radis, Framingham, all of Mass., assignors to Harvard Apparatus Company, Inc., Millis, Mass.**

**Filed June 16, 1975, Ser. No. 587,114**
**Int. Cl.² A44B *21/00*; A61M *5/22***
**U.S. Cl. 24—254** **8 Claims**



**1.** A syringe holder comprising:

a pair of clamp members spaced apart for receiving a syringe therebetween and having facing, generally concave surfaces for gripping said syringe in a clamping position of said clamp members, said clamp members pivotally mounted for rotation thereof from said clamping position to an open position thereof with one pair of adjacent edges of said surfaces farther apart than in said clamping position to permit insertion and removal of said syringe between said surfaces, and said clamp members having first latch means connected thereto;

first biasing means connected to said clamp members urging rotation thereof to said open position;

a pair of levers pivotally mounted, one adjacent each clamp member, said levers having second latch means engageable with said first latch means and moveable with said levers between a latching position engaging said first and second latch means locking said clamp members in said clamping position and an unlatched position in which said first and second latch means are disengaged whereby said first biasing means rotates said clamp members to said open position thereof; and

second biasing means connected to said levers urging movement thereof to said latching position.

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**3,964,140**

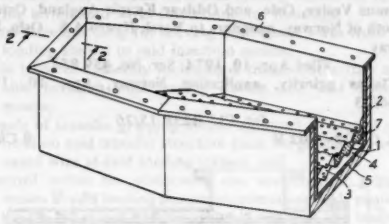
## COFFIN

**Fernand Gauchard, Parc du Beau, Santeny (Val-de-Marne), France**

**Filed Nov. 26, 1974, Ser. No. 527,294**
**Claims priority, application France, Nov. 26, 1973, 73.41952**
**Int. Cl.² A61G *17/00***
**U.S. Cl. 27—2** **2 Claims**

**1.** A coffin having a bottom and side walls and a pair of rigid corrugated and perforated superposed sheets in the bottom of the coffin parallel to but spaced between said bottom and the lower of said sheets, both said corrugated sheets being sub-

stantially parallel to but spaced apart from each other so as to form an intermediate chamber between said sheets, an absorbent material filling said intermediate chamber, and a drain fitting opening at the bottom of the lower chamber.




3,964,141

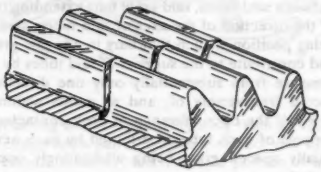
## CRIMPING GEARS AND PROCESS

**Alan Keith Dunnell, Pinelands, South Africa; Thomas Cyril James Wade, Kibworth-Harcourt, and David Greenwood, Oadby, both of England, assignors to Imperial Chemical Industries Limited, London, England**

**Continuation of Ser. No. 325,762, Jan. 22, 1973, abandoned. This application Oct. 9, 1974, Ser. No. 513,444**

**Int. Cl.² D02G *1/14***

**U.S. Cl. 28—1.8** **3 Claims**



1. Crimping gears comprising two or more gears in meshing engagement, one or more of said gears being driven, characterized in that at least one of the said gears is an integral structure having timing gear teeth and crimping gear teeth of the same outside diameter, the tooth thickness of the crimping teeth being less than the tooth thickness of the timing teeth at any given diameter of the structure.

3,964,142

## APPARATUS FOR CUTTING AND STRIPPING INSULATED WIRE

**Akira Ogawa, Kawanishi, and Masashi Sakao, Nishinomiya, both of Japan, assignors to Shin Meiwa Industry Co., Ltd., Nishinomiya, Japan**

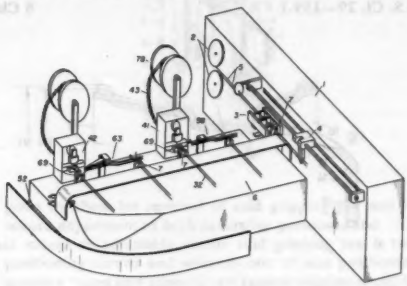
**Filed Feb. 14, 1975, Ser. No. 550,125**

**Claims priority, application Japan, Feb. 20, 1974, 49-20766; Sept. 18, 1974, 49-108088**

**Int. Cl.² H01R *11/08***

**U.S. Cl. 29—33 M** **15 Claims**

1. An apparatus for cutting an insulated electric wire into lengths and processing the ends of the resulting wire lengths comprising means for intermittently supplying said insulated electric wires through a predetermined distance in the direction of the axis of the wire, wire cutting means for cutting said supplied wire at a predetermined position during interruption of supplying operation of said wire supplying means to provide said wire length of a predetermined length, insulator cutting means for cutting substantially only the insulator of said cut wire length at a position spaced forwardly of the cutting position of said wire cutting means during interruption of supplying operation of said wire cutting means, wire length transfer means for intermittently transferring transversely of said wire supplying means the successive wire lengths in association with the intermittent supply of the wire, said transfer means including a plurality of gripping means disposed at predetermined intervals for gripping said wire lengths, one of said gripping means gripping the wire length during the interruption of the supplying operation of said wire supplying means, said transfer means having one end arranged close to said wire cutting means and insulator cutting means, at least said one of said transfer means being movable between a normal position and a shifted position spaced forwardly of said normal position, the end of said transfer means opposite said one end being remote from said wire cutting means and insulator



cutting means, and shifting means for shifting said transfer means between said normal and shifted position, said shifting means being adapted to shift said transfer means forwardly from said normal position to said shifted position after one of said gripping means grips the wire length during the interruption of supplying operation of said wire supplying means, whereby the insulator portion disposed rearwardly of said insulator cutting means is stripped from said wire length, thereafter said one interval transferring of said wire length transfer means being started, said wire length transfer means being returned to said normal position such that the subsequent gripping means grips the subsequently supplied wire length.

3,964,143

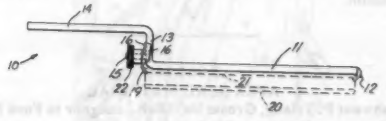
## HANDLE FOR HOLLOW FILE

**James A. Coon, 929 Drever St., West Sacramento, Calif. 95691**

**Filed July 8, 1974, Ser. No. 486,437**

**Int. Cl.² B23D *71/04***

**U.S. Cl. 29—80** **1 Claim**




1. A hollow file replaceable handle comprising an elongate bar, a hook integrally formed on one end of said bar, a second hook positioned adjacent the opposite end of said bar in opposed relation to said first hook, an integral upstanding portion on said bar, a threaded stud extending perpendicularly from said upstanding portion with said second hook mounted thereon, a thumb nut threaded on said threaded stud for engaging said second hook to move said second hook toward said first hook, said second hook being channel shaped and having a downward extending curved tang extending inside the hollow file toward the first hook and having opposing flanges along its insides to straddle the upstanding portion,

and hand grip means extending integrally from said upstanding portion.

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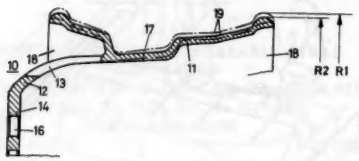
3,964,144
CAST ONE-PIECE ANNULAR RIM MEMBER FOR A VEHICLE WHEEL
Hans Kopp, Schaffhausen, Switzerland, assignor to Georg Fischer Aktiengesellschaft, Schaffhausen, Switzerland
Filed Oct. 15, 1974, Ser. No. 514,912
Claims priority, application Switzerland, Oct. 16, 1973, 14612/73
Int. Cl.² B21H 1/10; B21K 1/38; B22C 9/28
U.S. Cl. 29—159.1 8 Claims




1. Process for the manufacture of an annular rim member to established radial dimensions for use in a vehicle wheel equipped with a pneumatic tire and, in particu¹ar, a tubeless tire, with the rim member forming a one-piece annular rim or an annular rim part including a wheel lip, supporting lugs or a support ring, comprising the steps of forming a mold cavity for the rim member with at least one of a radial overdimension and a radial underdimension of an amount other than the customary excess dimension provided for shrinkage or as a processing allowance, at least over an annular portion of the rim cross-section and with the outer surface of the rim member arranged to face the tire having an unitary annular area, pouring an iron-carbon melt into the mold cavity for forming the rim member with a ductile structure, removing the cast rim member from the mold cavity and radially plastic cold working the solidified cast rim member for plastically deforming the rim member during which plastic deformation the yield point of the cast ductile structure is exceeded and attain the established radial dimensions of the rim member for removing the at least one of a radial overdimension and a radial underdimension.

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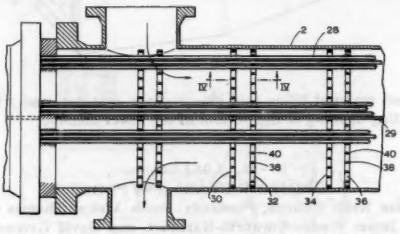
3,964,145
APEX SEAL MATERIAL
Yeshwant P. Telang, Grosse Ile, Mich., assignor to Ford Motor Company, Dearborn, Mich.
Filed Mar. 6, 1974, Ser. No. 448,797
Int. Cl.² B22F 3/00, 5/00, 1/04; F01C 21/00
U.S. Cl. 29—182 4 Claims

1. A sintered apex seal, for use in a rotary internal combustion engine, comprising:

a. a sintered powdered body effective to be resiliently urged into dynamic rubbing sealing engagement with another surface of said engine, said body being particularly characterized by a copper matrix containing by weight 0.1–0.6% chromium and free carbon in the range of 0.5–1.5%, said chromium substantially being in a precipitate form in said copper matrix rendering a surface hardenability level for said compact in the range of 50–75 $R_B$.

3,964,146
MEANS FOR ASSEMBLY OF TUBE BANKS IN HEAT EXCHANGERS
Rasmus Vestre, Oslo, and Oddvar Kaurin Augland, Osteras, both of Norway, assignors to Norsk Hydro A.S., Oslo, Norway
Filed Apr. 10, 1974, Ser. No. 459,852
Claims priority, application Norway, Apr. 10, 1973, 1466/73
Int. Cl.² B23P 15/26
U.S. Cl. 29—202 R 8 Claims




1. An arrangement of fixation of parallel spaced tubes in tube banks in heat exchangers with longitudinal flow externally of the tubes, said arrangement comprising:

a plurality of tube support grates spaced along the axes of said tubes, each grate having bars located within spacings between said tubes, said grate bars extending transversely of the direction of the axes of said tubes, said grate bars being positioned such that bars in any one grate contact and contribute to the support of said tubes by a resultant pressure from substantially only one direction and directed transversely of, and at points within less than one-half the circumference of each contacted tube, the support of each tube contributed by each next adjacent axially spaced grate being alternatingly oppositely directed.

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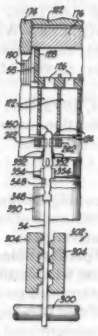
3,964,147
CONNECTOR ASSEMBLY MACHINE
Vito A. Fusco, Palos Hills, Ill.; Ove Christian Carlsen, Round Rock, Tex., and Steven F. Wright, Glen Ellyn, Ill., assignors to Molex Incorporated, Lisle, Ill.
Filed Jan. 2, 1975, Ser. No. 538,188
Int. Cl.² H01R 43/00
U.S. Cl. 29—203 B 43 Claims



1. In a connector assembly machine for assembling terminated wires into connector housings, the combination comprising:

a loading station disposed adjacent the front of the machine for receiving terminated wires;

insertion means spaced from said loading station for inserting terminated wires into connector housings;

a transfer assembly for moving terminated wires from said loading station to said insertion means;

said transfer assembly including a transfer structure movable between said loading station and said insertion means;

a pair of transfer gripping means mounted at spaced positions on said transfer structure each for gripping a terminated wire at said loading station; and

control means for positioning one said transfer gripping means at said loading station and simultaneously positioning the other said transfer gripping means at said insertion means.

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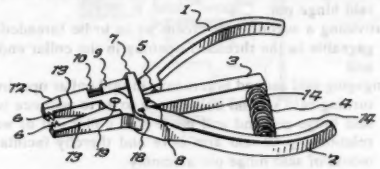
**3,964,148**

## CONDENSER LUG EXTRACTOR

**Rodney Lee Sturtevant, 16 Broughton, Tonawanda, N.Y. 14150**

**Filed Jan. 13, 1975, Ser. No. 540,528**
**Int. Cl.² B25B** *7/00*
**U.S. Cl. 29—203 H** **6 Claims**



1. An extracting tool for removing a lug from an electronic part which comprises a pair of handle members, one of which, a gripping handle member, has a handle portion at one end thereof and a gripping jaw portion at the other end thereof and the other of which, a ram actuating handle member, has a handle portion at one end thereof and includes at the other end thereof means for actuating a ram, a gripping member separately pivotally connected to the handle members and having a gripping jaw portion at an end thereof, means for transmitting force between the gripping member and the handle portion of the ram actuating handle member and a ram positioned adjacent to one of the jaws to be moved substantially transversely to the direction of jaw movement of the ram actuating means as the handles are squeezed to be moved closer together after gripping of the lug, so that when the handles are squeezed together the jaws of the gripping member and the gripping handle member are brought together to grip the lug of the electronic part and the ram presses against the electronic part to pull the lug therefrom.

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**3,964,149**

## REVERSIBLE PULLER

**Melvin D. Hugh, Wilmington, Calif., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.**

**Filed May 5, 1975, Ser. No. 574,387**
**Int. Cl.² B23P** *19/04*
**U.S. Cl. 29—261** **5 Claims**

1. A pulling device comprising:

a cross block;

a forcing screw threadably engaged in said cross block for relative perpendicular movement thereto;

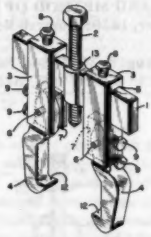
a plurality of pivot blocks disposed on said cross block for relative longitudinal movement thereto;

a gripping jaw having a work engaging surface on one side of said jaw pivotally mounted on each of said pivot blocks;

means to adjustable secure said gripping jaw from pivotal rotation in both the clockwise and counterclockwise directions;

said pivot blocks are reversible on said cross block and said gripping jaws are reversible in said pivot block;

said gripping jaws have bearing surfaces on both sides of the jaw about the pivot for engagement with said means to adjustably secure said gripping jaw from rotation about its



pivot to allow for reversal of said gripping jaw and its secure adjustment in both reversible positions; and

said means to adjustably secure said gripping jaw is two positioning screws and wherein one of said positioning screws secures said gripping jaw against rotation about its pivot in a clockwise direction and the other of said positioning screws secures said gripping jaws against rotation about its pivot in a counterclockwise direction.

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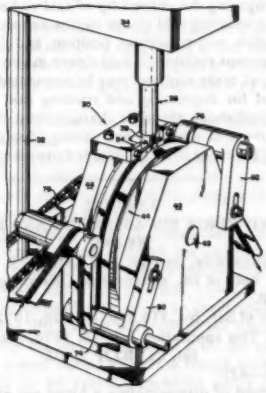
**3,964,150**

## METHOD FOR MAKING SLIDE FASTENERS

**George B. Moertel, Conneautville, Pa., assignor to Textron, Inc., Providence, R.I.**

**Division of Ser. No. 289,852, Sept. 18, 1972, Pat. No. 3,885,276. This application May 22, 1975, Ser. No. 579,982**
**Int. Cl.² B29D** *5/00*
**U.S. Cl. 29—408** **6 Claims**



1. A method of making tape of a slide fastener chain comprising the steps of

constructing a tape made of a fabric having a textile matrix of interlaced warp and weft threads of generally circular configuration,

moving the tape at uniform speed along a predetermined path,

guiding the tape during its movement, and

changing the circular configuration of the warp and weft threads along a portion of the tape to non-circular configuration by physically compacting the portion of the tape during its movement to form a channelized section on the tape.

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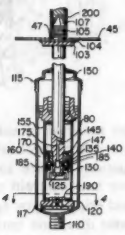
3,964,151

## TOOL FOR ADJUSTING MOTOR VEHICLE SUSPENSION SYTEMS, AND METHOD OF USING SAME

William N. Thrasher, 14205 Cantrell Road, Silver Spring, Md. 20904

Filed Aug. 8, 1975, Ser. No. 603,241
Int. Cl.² B23P *19/00*; B25B *13/02*
U.S. Cl. 29—426 7 Claims




1. A tool for adjusting the shock absorption characteristics of a strut-type motor vehicle suspension system having a shock absorber with an axially extending piston rod end for attachment to the vehicle chassis, said rod end having a threaded outer surface and a shaped tip with the shock absorber characteristic being adjustable by rotating the piston rod about its axis while said shock absorber is fully depressed, comprising:

hollow sleeve means for threadedly engaging at one end the end portion of said piston rod when said rod end is detached from said vehicle chassis;

inner core means for insertion into said sleeve means and having a connector end formed with means for non-rotatably engaging the shaped tip of said rod end; and

means for securing said sleeve means and said core means in relative non-rotational position and for permitting simultaneous rotation of said sleeve means and said core means, whereby said tool may be connected to said piston rod end for depressing and rotating said piston rod to adjust said shock absorber characteristic, the subsequent detachment of said tool and raising of said rod end permitting the latter to be re-attached to said vehicle chassis.

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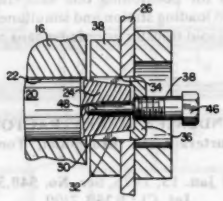
3,964,152

## TAPERED HINGE PIN ASSEMBLY AND REMOVAL MEANS

Robert F. Shankwitz, Oswego, and Anthony L. Garman, Stevensville, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 318,516, Dec. 26, 1972, Pat. No. 3,841,711. This application July 16, 1974, Ser. No. 488,897
Int. Cl.² B23P *19/02*
U.S. Cl. 29—427 3 Claims

1. A method of disassembling a hinge pin assembly of the type comprising an arm and a member located adjacent said arm, means defining a bore through said arm and said member, said bores being in concentric alignment, a hinge pin in said bores having a generally cylindrical center portion fitted within the bore in said member and having a tapered end portion bore of said arm, a generally cup-shaped collar defining generally cylindrical sidewalls and an end wall fitted within said arm bore, the interior wall of said collar being tapered so as to be in engagement with the tapered end portion of said hinge pin, an axially disposed threaded bore in the tapered end of said hinge pin, and end wall opening formed through the end wall of said collar, said opening being in concentric alignment with said hinge pin bore, first bolt means passing through said end wall bore in spaced relation thereto and threadedly engaged in said hinge pin bore and having head means thereon contacting said collar end wall whereby said collar is drawn toward said hinge pin so as to wedge the end portions thereof in said arm bore, and threads formed within said collar end wall opening, comprising the steps of:




removing said first bolt means from said bore in the end of said hinge pin,

providing a second bolt means so as to be threadedly engageable in the threaded opening in the collar end wall, and

engaging said second bolt means in said collar opening and turning said second bolt means so as to advance toward said hinge pin end and move said collar out of wedged relationship in said arm bore and thereby facilitate removal of said hinge pin assembly.

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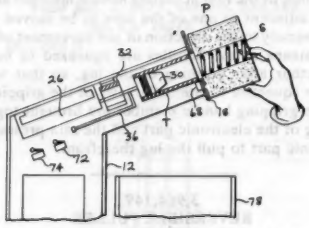
3,964,153

## METHOD FOR TRANSFERRING YARN PACKAGES FROM A WINDING TUBE TO A CORE FOR DYEING

Graham Frank Clifford, Stanley, N.C., and Mack W. Spurrier, Clover, S.C., assignors to Gaston County Dyeing Machine Company, Stanley, N.C.

Division of Ser. No. 443,629, Feb. 19, 1974, Pat. No. 3,899,817. This application Feb. 21, 1975, Ser. No. 551,760
Int. Cl.² D06B *3/04*, *5/16*; B23P *11/02*, *19/02*
U.S. Cl. 29—427 6 Claims




1. The method of transferring a yarn package from a core tube on which it has been wound to a core suitable for supporting the package for dyeing, which method comprises inserting the dye core within the winding tube having said package wound thereon, supporting said package endwise with an end portion of said winding tube at the supported package end located over an expandable and reciprocable chuck while maintaining the dye core free of said chuck, and then causing said chuck to grip said winding tube interiorly and withdraw the same from the supported package while concurrently causing the dye core to assume a proper supporting position within the package.

5. The method defined by claim 1 wherein the recited method steps are repeated after dyeing for removing said dye core and replacing the same with a tube core of the sort initially used for winding the package.

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**3,964,154**

## DEVICE FOR SIMULTANEOUSLY STRESSING A NUMBER OF TENSION ELEMENTS

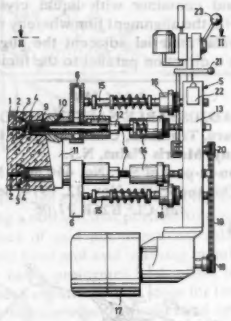
**Peter Auer, Ottobrunn, Germany, assignor to Dyckerhoff & Widmann Aktiengesellschaft, Munich, Germany**

**Filed June 30, 1975, Ser. No. 591,328**

**Claims priority, application Germany, July 10, 1974, 2433035**

**Int. Cl.² B21D** *39/00*

**U.S. Cl. 29—452** **3 Claims**



1. Device for the simultaneous tensional stressing of a plurality of elongated tension elements for prestressing a concrete member, such as rod-shaped tension elements where each tension element includes an anchor element mounted thereon and an anchor nut adjustably positionable on the tension element into engagement with the anchor element, a puller for each tension element, a mechanically driven spindle connected to each said puller, said spindle arranged to be connected to a tension element to be stressed, a mechanically driven wrench sleeve associated with each said spindle and arranged to adjust the anchor nut associated with the tension element to which said spindle associated with said wrench sleeve is arranged to be connected, a drive means for mechanically rotationally driving each of said spindles and each of said wrench sleeves, said drive means including a power source and a drive train connected to and extending between said power source and said spindles and wrench sleeves, and a safety clutch located in said drive train, wherein the improvement comprises that a separate said safety clutch is provided for each said spindle and each said wrench sleeve.

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**3,964,155**

## METHOD OF PLANAR MOUNTING OF SILICON SOLAR CELLS

**Charles Z. Leinkram, Bowie, Md.; William D. Oaks, Midland, Va.; John A. Eisele, Oxon Hill, Md., and Bruce J. Faraday, Annandale, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Division of Ser. No. 228,593, Feb. 23, 1972, Pat. No. 3,833,425. This application June 8, 1973, Ser. No. 368,405**

**Int. Cl.² B01J** *17/00*

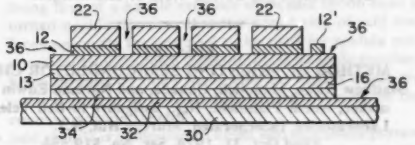
**U.S. Cl. 29—572** **7 Claims**

1. A method of mounting solar cells on a metallic panel to provide a direct thermal path between the cells and the panel comprising the steps of:

coating an electrically insulative wafer with an electrically and thermally conductive coating on the top and bottom surfaces thereof;

removing the conductive coating on the top surface of the coated wafer except on predetermined areas to form a number of prominences thereon, the number of said prominences being at least equal to the number of said cells;

attaching said cells on said prominences, each cell being located on a different prominence;



coating the surface of said panel with a coating to which it is easy to solder, said coating being thermally conductive;

coating the panel coating with a soft solder capable of absorbing mechanical stresses due to thermally induced expansions, said solder being thermally conductive; and

soldering the bottom surface of said solar-cell-bearing wafer to the soft-solder surface of said panel.

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**3,964,156**

## ELECTRICAL SOLID-STATE DEVICES

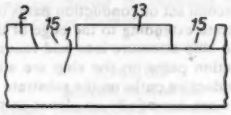
**Brian David Williams, Cogenhoe; David Perkins, Wootton, and Dennis George Dale, Northampton, all of England, assignors to Plessey Handel und Investments A.G., England**

**Continuation of Ser. No. 425,896, Dec. 18, 1973, abandoned. This application Mar. 25, 1975, Ser. No. 561,831**

**Claims priority, application United Kingdom, Feb. 24, 1973, 9195/73**

**Int. Cl.² B01J** *17/00*

**U.S. Cl. 29—579** **2 Claims**



1. A method of manufacturing an electrical solid-state device comprising a substrate supporting a film material which is divided into lands by demarcation gaps in which method the width of the demarcation gaps is determined by the following stages:

i. forming on a substrate a film or film material having a given thickness;

ii. covering the film with a layer of photo-resist;

iii. photographically forming in said layer a trace channel having walls constituted by defined edges of photo-resist and a floor of film material;

iv. forming a trough in the film material by presenting an etchant into the trace channel, the etchant reducing the film thickness until such time as the substrate is exposed over a width equal to the width between said defined edges, the etchant performing an incidental etching action during this time at the walls of the trough;

v. continuing the incidental action after the expiry of said time for a spell during which the trough walls are caused to recede to an extent dependent partly on the spell duration and partly on the film thickness, the recession of a wall forming at the floor of the trough a margin of exposed substrate material which is overhung by photo-resist, the width of the margin being dependent partly on the duration of said spell, and partly on the thickness of said film;

vi. introducing further film material from a source above the substrate and the photo-resist, the introduced material forming on the substrate a deposit which replaces material which was removed by the etchant to form a trough,

the photo-resist which overhangs the margin preventing the formation of a deposit at the margin, the margin serving as a floor of a demarcation gap separating the deposit from film material which was not attacked by the etchant, and

vii. removing the entire photo-resist and redundant further film material deposited thereon, to leave the substrate supporting film material which is divided into lands by a demarcation gap having width of said margin.

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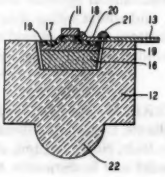
**3,964,157**

## METHOD OF MOUNTING SEMICONDUCTOR CHIPS

**Matthew Kuhn, Manotick, Canada, and Norman Edwin Schumaker, North Plainfield, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Oct. 31, 1974, Ser. No. 519,594**
**Int. Cl.² H01L 21/00**
**U.S. Cl. 29—591** **12 Claims**




1. A method of mounting a semiconductor chip structure including a first set of conductor paths thereon onto an insulating substrate comprising the steps of:

forming a recess in said insulating substrate;

forming a second set of conduction paths on the surface of said substrate extending to the edge of the recess;

bonding said chip structure into said recess so that the set of conduction paths on the chip are aligned with associated conduction paths on the substrate and the conduction paths are essentially co-planar at the edges of the chip and substrate, thereby forming a gap between the associated conduction paths; and

applying to said associated conduction paths a liquid conducting material which is different from the material of the conduction paths and which is unsupported by any material in the gap such that the surface tension exerted by each pair of associated conduction paths on the liquid forms a conductive bridge over the gap between said pair of associated conduction paths.

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**3,964,158**

## METHOD OF MAKING A LIQUID CRYSTAL DISPLAY CELL

**John L. Janning, 332 Vindale Drive, Dayton, Ohio 45440**

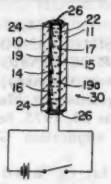
**Division of Ser. No. 386,472, Aug. 7, 1973, Pat. No. 3,834,792, which is a continuation of Ser. No. 242,675, April 10, 1972, abandoned. This application June 19, 1974, Ser. No. 480,665**
**Int. Cl.² G02F 1/13**
**U.S. Cl. 29—592** **18 Claims**

1. A method of forming a liquid crystal display cell, comprising:

a. positioning at least a portion of a surface of a transparent container so that it makes a selected acute angle with respect to the direction from a deposition source for a selected material;

b. depositing a transparent alignment film from said deposition source onto said portion of said surface of said container in order to form a transparent film growth at approximately said selected acute angle to said inner surface of said container; then

c. forming a container including said portion such that the transparent alignment film faces the interior of the container;




d. filling said container with liquid crystal material in contact with the alignment film whereby molecules of the liquid crystal material adjacent the alignment film are aligned in a direction parallel to the film growth.

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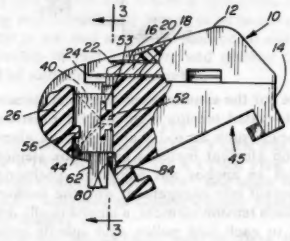
**3,964,159**

## ADJUSTABLE SAFETY RAZOR

**Frank A. Ferraro, Trumbull, Conn., assignor to Warner-Lambert Company, Morris Plains, N.J.**

**Continuation-in-part of Ser. No. 466,600, May 3, 1974, abandoned. This application Nov. 22, 1974, Ser. No. 526,080**
**Int. Cl.² B26B 21/06**
**U.S. Cl. 30—47** **12 Claims**




1. An adjustable safety razor comprising:

a. a blade seat member,

b. at least one blade positioned on said blade seat member, said at least one blade comprising at least one cutting edge,

c. an elongated guard structure parallelly spaced forwardly of said at least one cutting edge,

d. means for hinging said guard structure to said blade seat member, said hinging means defining an axis parallel to said guard structure,

e. a manually operable slide member,

f. means slidably interconnecting said slide member and said blade seat member for guiding said slide member in a direction parallel to said axis, and

g. means slidably interconnecting said slide member and said guard structure in an angular direction with respect to said axis for moving said guard structure about said axis to adjust said guard structure with respect to said at least one cutting edge upon manual operation of said slide member.

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**3,964,160**

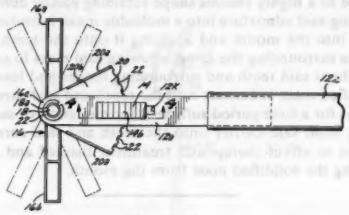
## SAFETY RAZOR WITH AN ANGULARLY ADJUSTABLE HEAD

**Garron Gordon, 3051-C Via Serrena South, Laguna Hills, Calif. 92653**

**Filed Apr. 2, 1975, Ser. No. 564,538**
**Int. Cl.² B26B 21/52**
**U.S. Cl. 30—89** **1 Claim**

1. A safety razor comprising in combination,

a handle formed with a relatively square cross section,
a head adapted to receive and retain a safety razor blade and formed with a relatively flat boss for cooperation with one side of said square cross section of said handle,
a pivot pin fixed to said head and extending from said relatively flat boss,
said handle being formed with an opening for receiving said pin,
said pivot pin being generally cylindrical permitting pivotal movement of said head relative to said handle and formed with a longitudinal flat surface,
a relatively flat indexing member interposed between said boss and said handle and being formed with a generally



circular through opening for receiving said pin, said opening having a non-circular portion for cooperation with the flat surface of said pin to prevent relative rotation between said head and said indexing member, said indexing member being preformed with offset marginal opposite edges which constitute limit stops for limiting the amount of rotational movement of said head on said handle,
one of said sides of said cross section of said handle being formed with a rectangular cutout,
locking means rectilinearly movable on said handle within said rectangular cutout between positions of engagement and disengagement with said indexing member,
and means biasing said locking member toward said position of engagement with said indexing member.

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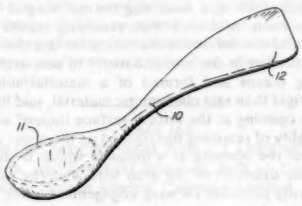
**3,964,161**
**WOODEN CAMPING TOOL**

**Colleen M. Wise, 233 W. Macarthur, South Saint Paul, Minn. 55075**

**Filed Sept. 15, 1975, Ser. No. 613,346**
**Int. Cl.² A47J *43/28***
**U.S. Cl. 30—142** **5 Claims**



1. A unitary wooden cooking tool having a shank portion with a spoon-bowl at one end and a spatula at the other, said tool having a longitudinal axis lengthwise thereof extending through said shank portion, the side of said tool facing upwardly when said spoon-bowl is used as a serving spoon being the ventral surface of said tool, and the opposing side of said tool being the dorsal surface thereof, said tool being characterized by the following features in combination:
a. said spoon-bowl is contoured to blend into said shank portion and extends symmetrically from said shank portion, is contoured so that its outermost end projects ventrally relative to said axis, is free of sharp lip edges, is wider than it is deep, is approximately one-half cup in size, and is in excess of 5 millimeters thickness at the bottom portion thereof and tapers along the sides thereof to a narrower thickness at said non-sharp lip edges thereof, said contoured shape and size and thickness and non-sharp lip edges of said spoon-bowl being such that said spoon-bowl serves a dual function, one function being that of a spoon-bowl per se and the other function being that of a handle member when said spoon-bowl is turned upside down so that the dorsal side of said tool faces upwardly for said tool to be used for spatula purposes, said upside down spoon-bowl, as a handle member, being gripped by one's hand with the fingers inside the convex portion of the spoon-bowl and the palm on the concave portion thereof;
b. said spatula is contoured to blend into said shank portion and, except for its end most remote from the said spoon-bowl, extends as a symmetrical structure from said shank portion, is a gradually fanned structure curved away from said axis to project dorsally relative to said axis, is free of sharp edges except at its said most remote end, is at least 5 millimeters thick except for the distance up to approximately 4 centimeters inwardly from its said most remote end, and is tapered toward its said most remote end into a termination as a relatively sharp substantially straight edge which slopes at an angle other than perpendicular to said axis, said slope of said straight edge being between 5° and 25° from a line perpendicular to said axis, and said slope of said straight edge being further characterized by the fact that the off-center lateral outwardmost portion of said slope is on the lateral side of said tool most remote from an individual gripping said spoon-bowl as aforesaid and using said tool for spatula purposes, said gradually fanned structure of said spatula being also functional as a handle member for gripping when said tool is used as a serving spoon; and
c. said shank portion of said tool is, in cross-section, at least about one centimeter in thickness in all directions through the center thereof.

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**3,964,162**
**BLADE SCRAPER**

**Ronald L. Gerson, Newton, and Lawrence A. Caprio, Whitman, both of Mass., assignors to Louis M. Gerson Co., Inc., Middleboro, Mass.**

**Filed June 25, 1975, Ser. No. 590,278**
**Int. Cl.² B26B *1/08***
**U.S. Cl. 30—162** **7 Claims**

1. A razor blade cutting device comprising,
a hand gripping casing having an enclosed blade storage compartment closed by a cover,
a slide carrying means for mounting and carrying a cutting blade,
said slide being mounted in a chamber defined by said casing with said chamber defining an opening at an end of said casing,

pressure activated locking means for locking said slide and blade in a first retracted position with said blade wholly within and encased by said chamber and a second position with said blade moved toward said opening,

pressure actuated first safety means providing a safety lock to hold said slide and blade in said first position while permitting release of said slide upon pressure actuation thereof whereby pressure must be applied to said first safety means and said locking means to expose said blade, and

second safety means comprising a stop means for preventing opening of said cover unless said locking means and safety means are actuated to move said slide from said first position.

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**3,964,163**

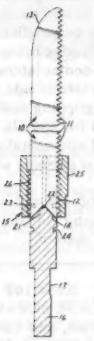
**SURGICAL SAW BLADE FASTENING MEANS**

**Anthony Russo, La Habra, Calif., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Sept. 4, 1975, Ser. No. 610,100**

**Int. Cl.² B26D** *1/06;* **A61B** *17/14;* **B23D** *49/10*

**U.S. Cl. 30—166 R** **5 Claims**



**1.** A surgical saw blade fastening means comprising in combination:

a surgical saw blade member having a plurality of cutting teeth along one edge of said saw blade member,

the other edge of said saw blade member being smooth and sloped adjacent one end to intersect the toothed edge of said saw blade member.

the other end of said saw blade member having a locating and locking means for securely holding said saw blade member in position,

a chuck assembly having a shank portion for attachment to a surgical instrument,

a body portion having at least one axial slot therein of a width sufficient to accept said saw blade member therewithin,

the base of said slot having a locating and locking means complementary to the locating and locking means on said saw blade member, and

an internally threaded collar carried on said body portion,

the lands and grooves of the threads of said internally threaded collar being adapted to engage the lands and grooves of the teeth of said saw blade member thereby firmly engaging the locating and locking means of said saw blade member and said body portion and clampingly compressing the body portions on either side of said axial slot against said saw blade member.

**3,964,164**

**METHOD OF APPLYING PREVENTIVE AND THERAPEUTIC AGENTS**

**Sven-Gunnar Hesselgren, Angsholmen, S-170 11 Drottningholm, Sweden**

**Filed Jan. 25, 1974, Ser. No. 436,737**

**Claims priority, application Sweden, Feb. 5, 1973, 73015448**

**Int. Cl.² A61C** *19/00;* **A61K** *9/00*

**U.S. Cl. 32—1** **5 Claims**

**1.** A method for local application of a therapeutic agent on the teeth and the tissues surrounding the teeth, comprising the steps of admixing an active therapeutic agent with a carrier formed of an inert solid composition capable of being converted to a highly viscous shape retaining elastic consistency, forming said admixture into a moldable mass, introducing said mass into the mouth and applying it onto the teeth and the tissues surrounding the same, allowing said mass to solidify in situ about said teeth and surrounding tissues and leaving said solidified mass in contact with the teech and said surrounding tissues for a time period sufficient for migration of said active agent from said carrier onto the teeth and said surrounding tissues to effect therapeutic treatment thereof and then removing the solidified mass from the mouth.

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**3,964,165**

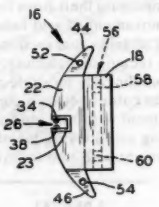
**ELASTOMERIC ORTHODONTIC APPARATUS**

**Lee W. Stahl, 4325 Mockingbird Lane, Toledo, Ohio 43623**

**Filed May 23, 1974, Ser. No. 472,618**

**Int. Cl.² A61C** *7/00*

**U.S. Cl. 32—14 A** **8 Claims**




**1.** An orthodontic apparatus for use with an arch wire in straightening teeth comprising:

a band for attaching the orthodontic apparatus to a tooth;

a bracket formed of an elastomeric material and attached to said band, said bracket including a base portion and at least one arch wire receiving means integral with said base portion, said arch wire receiving means having a horizontal slot defined in the buccal surface thereof; and

a liner retained in the horizontal slot of said arch wire receiving means and formed of a material substantially more rigid than said elastomeric material, said liner defining an opening at the buccal surface thereof and having a plurality of retaining tips formed on the upper and lower walls of the opening at a distance which is slightly less than the diameter of the arch wire whereby said liner is resiliently yieldable for snap engagement of the arch wire and said elastomeric arch wire receiving means is deflected during said snap engagement.

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**3,964,166**

**DENTAL PROPHYLAXIS IMPLEMENT**

**Donald B. Stahlman, Indianapolis, Ind., assignor to Mynol, Inc., Broomall, Pa.**

**Filed Oct. 21, 1974, Ser. No. 516,399**

**Int. Cl.² A61C** *3/06*

**U.S. Cl. 32—59** **60 Claims**

**1.** A dental prophylaxis implement adapted for removable mounting on a dental hand piece and comprising

a unitary body formed of resilient material,

said unitary body having an applicator portion for performing a dental prophylaxis,

said resilient material having incorporated therein an anticariogenic agent and a water-soluble polymer, and

means in association with said unitary body for removably mounting the unitary body on the dental hand piece.

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**3,964,167**

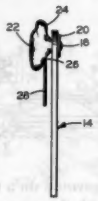
**DISPOSABLE TOOTH SHADE GUIDE**

**John G. Yerkes, P.O. Box 502, Bloomfield, Conn. 06002**

**Filed Oct. 24, 1974, Ser. No. 517,481**

**Int. Cl.² A61C *13/00***

**U.S. Cl. 32—71** **8 Claims**




1. A tooth shade guide member operable for use by a dentist in determining by comparison the particular shade of an artificial tooth that may be substituted for a natural tooth of patient comprising:

a. a tooth-simulating member having at least a front face dimensioned and configured to provide the appearance of a natural tooth, said tooth-simulating member being formed of a non-toxic material and having a preselected visible coloration;

b. an alongated mounting member operable as a support for said tooth-simulating member and formed of a non-toxic material;

c. means pivotably mounting said tooth-simulating member adjacent one end of said mounting member for pivotal movement relative thereto; and

d. translucent cover means detachably secured on said front face of said tooth-simulating member, said cover means being formed of a non-toxic material transmitting light therethrough, said cover means when mounted on said front face of said tooth-simulating member having a coloration effective to alter said visible coloration of said tooth-simulating member so as to produce a variation in the shade of the apparent coloration of said tooth-simulating member from that seen when said cover means is dismounted from said front face of said tooth-simulating member.

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**3,964,168**

**SCANNING MECHANISM FOR A LASER SCRIBER**

**Teiji Uchida, and Takayuki Mizutani, both of Tokyo, Japan, assignors to Nippon Electric Company Limited, Tokyo, Japan**

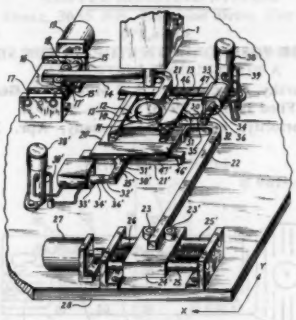
**Filed Jan. 6, 1975, Ser. No. 538,783**

**Claims priority, application Japan, Jan. 8, 1974, 49-5875[U]; June 26, 1974, 49-75262[U]; June 26, 1974, 49-75263[U]**

**Int. Cl.² G03B *23/08***

**U.S. Cl. 33—1 M** **10 Claims**

1. A scanning mechanism for a laser scriber comprising a stationary base plate, a first table arranged in overlying relation to said base plate and movable relative thereto in the X direction, a second table arranged in overlying relation to said first table and movable relative thereto in the Y direction independently of said first table, means for driving said first and second tables to cause mutually independent X- and Y-scannings of the plane of said second table with respect to a stationary laser head, first locking means having a first actuator mounted on said first table and operable during the period of said Y-scanning so as to be brought into pressure engagement with said second table upon the energization of said first




actuator to hold said second table against displacement relative to said first table, second locking means having a second actuator mounted on said base plate and operable during the period of said X-scanning so as to be brought into pressure engagement with said first table upon the energization of said second actuator, thereby to hold said first table against displacement relative to said base plate.

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**3,964,169**

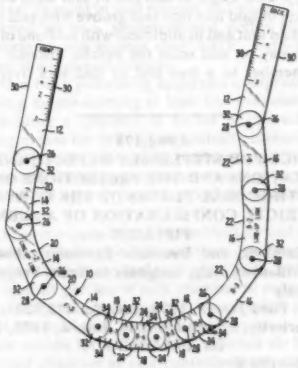
**GARMENT FITTING AID**

**Roberta F. Bush, 232 Sierra Drive, Walnut Creek, Calif. 94596**

**Filed Sept. 23, 1974, Ser. No. 508,552**

**Int. Cl.² A41H *1/02***

**U.S. Cl. 33—15** **1 Claim**



1. A garment fitting aid for determining body contours from the waist in front through the crotch to the waist in back, said fitting aid comprising:

a. a plurality of links, means pivotally joining together said links so as to form a chain of links with two free ends;

b. said chain of links having a first series of links with curved edge portions adapted for engagement with the front of the body;

c. a second series of links with curved edge portions adapted for engagement with the back of the body; and

d. a plurality of links intermediate said first and second series of links, each of said intermediate links being

shorter in length than the links in said first and second series and having opposite edge portions formed to the same curvature whereby said intermediate links may be folded back upon themselves to vary the length of the chain of links and,

e. said two free ends terminating in links with straightedges with distance indicia thereon.

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**3,964,170**

## GAUGE FOR POSITIONING A STOP ON THE SHAFT OF A ROOT-CANAL INSTRUMENT

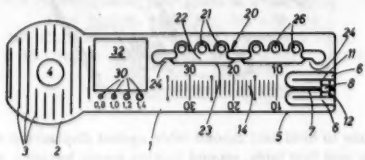
**Eduard Zdarsky, Brautigamstr. 5, 8 Munich 71, Germany**

**Filed Jan. 22, 1975, Ser. No. 542,935**

**Claims priority, application Germany, Apr. 3, 1974, 2416275**

**Int. Cl.² G01B 5/18**

**U.S. Cl. 33—169 B** **5 Claims**



1. A gauge for setting the position of a stop member on a shaft of a root-canal instrument, said gauge comprising:

an elongated base plate formed at one end with a longitudinally extending groove, and formed at the opposite end with a handle;

a seat recessed in the flanks of said groove and defined between a pair of walls transverse to the axis of said groove whereby said walls can abut against respective end faces of said stop member when the latter is positioned in said seat, one of said walls being disposed further inwardly from said end than the other of said walls; and

an elongated scale formed on said plate in line with said groove and provided with distance-measuring indicia having a scale origin at said one of said walls whereby the insertion of said tool into said groove with said stop member in said seat and in abutment with said one of said walls will display on said scale the precise distance from said stop member to a free end of said tool overlying said scale.

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**3,964,171**

## DEVICE FOR STEPLESSLY DETECTING THE OVALIZATIONS AND THE PROJECTIONS ON TWO ORTHOGONAL PLANES OF THE CURVED GEOMETRICAL CONFIGURATION OF A SUBMERGED PIPELINE

**Arnaldo Gambini, and Demetrio Terenziani, both of San Donato Milanese, Italy, assignors to Snam Progetti S.p.A., Milan, Italy**

**Filed June 3, 1974, Ser. No. 475,924**

**Claims priority, application Italy, June 4, 1973, 24986/73**

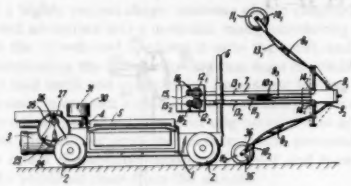
**Int. Cl.² G01B 7/12**

**U.S. Cl. 33—178 E** **5 Claims**

1. Apparatus for steplessly detecting the ovalizations and the projections on two orthogonal planes of the curved geometrical configuration of a pipeline being laid underwater comprising: a self-propelled carriage adapted to run within a pipeline, said carriage having mounted on it driving wheels and means for detecting deformations on the inner surface of said pipeline, means for measuring the distance covered by the carriage in the pipeline, means for sensing the slope in a vertical plane of the pipeline, and means for sensing the shiftings in a horizontal plane of the pipeline wherein:

a. said means for feeling the inner surface of said pipeline comprises a set of at least four feelers resiliently mounted, two by two opposed, on a head vertically adjustable, each feeler being constituted by a lever backwardly inclined as to the running direction of the carriage, to the free end of which there is pivotally mounted a small sliding and feeling wheel which is adapted to be resiliently pressed against the inner surface of the pipeline, the said lever being connected by an inextensible wire to a first spring-loaded gear on which the said wire is wound and which meshes a second gear which is integral with the wiper of a potentiometer;

b. said means for sensing the slope in a vertical plane of the pipeline comprises a gravity inclinometer for sensing the slope in a vertical plane of the carriage which comprises



a moving element pivoted on a tooth pin meshing a gear which is integral with the wiper of a potentiometer;

c. said means for sensing the shiftings in a horizontal plane of the pipeline comprises a gyroscope; and

d. said means for measuring the distance covered by the carriage inside the pipeline comprises a pulse tachometer including contact switch which is mounted on one of the small sliding and feeling wheels and which closes at every complete revolution of said one small sliding and feeling wheel, an electric circuit thereby delivering a voltage pulse, said circuit comprising two diodes connected in parallel, oriented in opposite directions, and which at their turn are connected in series to a resistance.

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**3,964,172**

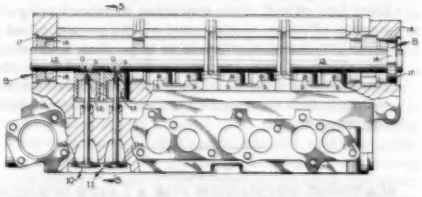
## CALIBRATION SHAFT ASSEMBLY FOR ENGINE VALVE ADJUSTMENT

**Thomas H. Wright, 4249 SW. 62nd Ave., Miami, Fla. 33155**

**Filed May 30, 1975, Ser. No. 582,171**

**Int. Cl.² G01B 5/14**

**U.S. Cl. 33—181 AT** **4 Claims**



1. An apparatus for use in adjusting individual valves in an automotive engine having an overhead camshaft operating directly on tappets for the valves, said apparatus comprising:

a calibration shaft having an elongated cylindrical periphery of a length sufficient to span the engine valve tappets simultaneously, the radius of said calibration shaft being equal to the minimum radius of each cam on the overhead camshaft for the engine;

and two bushings spaced apart along said calibration shaft for supporting said shaft on the engine with its elongated cylindrical periphery spanning the valve tappets;

said calibration shaft having a plurality of diametrical openings therein spaced apart along its length in accordance with the spacings of the valve tappets;

and further comprising a plurality of cross pins slidably received snugly in said openings for adjustment diametrically beyond said openings at the bottom of said calibration shaft;

and means for releasably clamping said pins in place individually in said openings.

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**3,964,173**

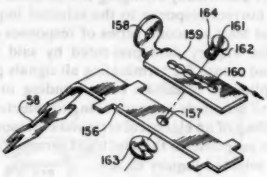
**ADJUSTABLE SIGHT FOR FIREARM APPARATUS**

**Maxwell G. Atchisson, 55 Old Yellow Springs Road, Apt. H, Fairborn, Ohio 45324**

**Division of Ser. No. 250,006, May 3, 1972, Pat. No. 3,850,076. This application Nov. 18, 1974, Ser. No. 524,522**

**Int. Cl.² F41G *1/18, 1/28***

**U.S. Cl. 33—254** **4 Claims**




1. Sighting mechanism for use with a firearm of the type firing a projectile along a path, comprising:

a first member mounted on the firearm to define a ramp disposed in angular relation to the path of projectile travel;

a second member mounted for selective movement along said ramp;

said second member having a structural portion defining a visual sight;

a plurality of intersecting apertures contiguously disposed on one of said first and second members;

an engagement member disposed on the other of said first and second members for selective inclined movement into and out of retaining engagement with each individual one of said plurality of apertures to retain said second member in each of a plurality of discrete positions relative to said first member;

resilient means yieldingly biasing said engagement member into engagement with a one of said apertures and yieldable in response to predetermined force applied to said second member for inclined movement out of said retaining engagement, so that said engagement member can be selectively moved for retaining engagement with the next contiguous one of said apertures;

said second member having an elongate portion which is movable along said ramp, and said plurality of apertures being disposed along said elongate portion;

said first member having an aperture which is selectively alignable with each individual one of said plural apertures as said second member is moved along said ramp; and

said engagement member extending through said aperture in said first member and into said retaining engagement with an individual one of said plural apertures.

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**3,964,174**

**CONTROLLED HUMIDITY FREEZE DRYING PROCESS**

**Cary J. King, Kensington, Calif., assignor to The Regents of the University of California, Berkeley, Calif.**

**Filed June 6, 1975, Ser. No. 584,597**

**Int. Cl.² F26B *5/06***

**U.S. Cl. 34—5** **9 Claims**

1. A method for limited freeze drying of foods comprising cooling the food to freeze water contained therein into ice, subliming the ice from the food in an atmosphere at a predetermined relative humidity, stabilizing the relative humidity in said atmosphere during the sublimation of ice from the food by continually contacting the atmosphere with a quantity of a hydrating salt.

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**3,964,175**

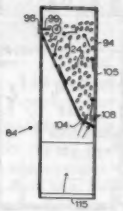
**COFFEE ROASTING SYSTEM**

**Michael Sivetz, 3635 NW. Elmwood Drive, Corvallis, Oreg. 97330**

**Filed Nov. 11, 1974, Ser. No. 522,485**

**Int. Cl.² F26B *17/10***

**U.S. Cl. 34—57 A** **24 Claims**




17. A coffee bean roaster comprising:

a. a roasting chamber formed by a wide shallow rectangular base plate with a multiplicity of spaced apart orifices therein, a front wall meeting said plate at an acute angle and extending upwardly therefrom, a back wall extending upwardly from said plate and diverging away from said front wall and side walls extending upwardly from said plate and joined to said front wall and said back wall;

b. a plenum connected to said chamber and communicating with said base plate;

c. a blower in said plenum and adapted to collect air and force it through said orifices with sufficient velocity to levitate a charge of coffee beans in said chamber in a dense, recirculating fluidized mass of beans; and

d. a heater element in said plenum and adapted to heat said collected air to a predetermined coffee bean roasting temperature not greater than 530°F., before said air is forced through said orifices.

20. Coffee bean processing apparatus comprising:

a. housing means forming at least one processing chamber for holding a quantity of coffee beans, said chamber having means for defining an undraft portion and a recirculation portion, said housing means connected to blower means and containing airstream directing means creating a controlled updraft in said updraft portion of said chamber;

b. said blower means to collect ambient air and force it into said chamber through said airstream directing means with sufficient velocity so that said updraft lifts coffee beans in said updraft portion of said chamber to move said quantity of coffee beans into said recirculation portion as a dense, recirculating fluidized mass; and

c. heater means for heating said collected air before entry into said chamber as said controlled updraft to a predetermined coffee bean processing temperature, said heater means including limiting means for providing said heated air updraft with a temperature not in excess of 530°F;

d. coffee bean temperature sensor means positioned within said chamber in said recirculation portion and completely outside of said controlled updraft portion, said sensor means for contacting said dense recirculating mass of coffee beans and operable for sensing the occurrence of pyrolitically induced thermal rise in said quantity of coffee beans undergoing heating; and

e. temperature indicator means connected to said temperature sensor means and operable for indicating measured virtual coffee bean temperature in said chamber and the

occurrence of pyrolitically induced thermal rise in said quantity of heated coffee beans.

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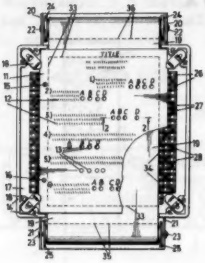
**3,964,176**

## INSTRUCTIONAL APPARATUS WITH MOVABLE BLANK SHEET

**James Richard Harte, 10 W. Concord, Kansas City, Mo. 64112**

**Filed Oct. 15, 1974, Ser. No. 514,492**
**Int. Cl.² G09B 3/08**
**U.S. Cl. 35—9 R** **7 Claims**



1. An instructional apparatus comprising:
a holding mechanism provided with an upper surface having depressions therein of at least two different depths;
a printed format presenting a holding margin and having holes therethrough inside said margin indicating answer choices,
said mechanism having means engageable with said margin for holding said printed format on said upper surface in overlying relationship thereto with the holes in the format in alignment with corresponding depressions in said upper surface, said holes and said depressions being adapted to receive a stylus used by a student to make answer selections; and
a blank response sheet freely sandwiched between said printed format and said upper surface and movable in a predetermined direction in increments therebetween, said sheet being narrower than said format transversely of said direction of movement to present opposed edges inside and clear of said holding means whereby, after holes are punched in the blank sheet by the student in making answer selections, the sheet may be repositioned to permit the sheet and said printed format to be reused.

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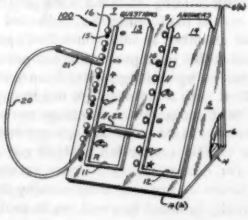
**3,964,177**

## REINFORCING TEACHING SYSTEM

**Thomas J. Wright, 630 Country Club Drive, Itasca, Ill. 60143**

**Filed Nov. 1, 1974, Ser. No. 519,817**
**Int. Cl.² G09B 7/06**
**U.S. Cl. 35—9 C** **9 Claims**



1. A teaching device for presenting a series of inquiry data and a corresponding number of responses comprising:
first display means for presenting a series of inquiry data, each of said inquiry data having an electrical terminal corresponding thereto,
second display means for presenting a series of responses to the data presented, each of said responses having an electrical terminal corresponding thereto,
probe means for electrically coupling the terminal corresponding to one of said inquiry data to one of the terminals corresponding to the selected response, and
an electrical control circuit means coupled to said terminals including indicator means corresponding to each inquiry data for providing a constantly activated signal to said indicator means in response to the coupling of the electrical terminal corresponding to the correct response to the electrical terminal corresponding to the selected data,
said electrical circuit means further including scrambler means for electrically changing the terminal corresponding to a correct response to the selected inquiry data to present at least a second series of responses corresponding to the inquiry data presented by said first display means and means for terminating all signals produced by the coupling of terminals corresponding to correct responses to terminals corresponding to selected data upon the coupling of an electrical terminal corresponding to an incorrect response to the electrical terminal corresponding to a selected inquiry data.

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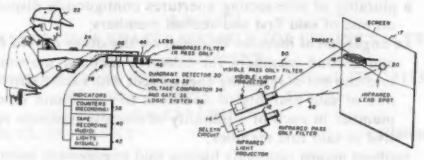
**3,964,178**

## UNIVERSAL INFANTRY WEAPONS TRAINER

**Albert H. Marshall, Maitland; Frank J. Oharek; John H. Dillard, both of Orlando, and Robert J. Entwistle, Winter Park, all of Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed July 3, 1975, Ser. No. 593,071**
**Int. Cl.³ F41G 3/26**
**U.S. Cl. 35—25** **8 Claims**



1. A weapon fire simulation system comprising
projection apparatus and film, said film being processed to provide from a first series of film frames a background scene including a target area and from a second series of film frames a lead aim spot;
said projection apparatus having a source of visible light for passing through said first series of film frames and a source of infrared light for passing through said second series of film frames;
drive means for coordinately driving said film frames in a desired degree of non-registration between said aim spot and said target area representative of the correct lead and elevation for a proper aiming of said weapon;
a projector screen for viewing said film frames;
a filter selected and positioned to filter all except infrared light from passing from said second film frames to said screen to provide an infrared aim spot on said screen and a filter selected and positioned to filter infrared light from passing from said first film frames to said screen;
a plurality of infrared sensor circuits, each forming a sensor channel and each comprising an infrared sensor and amplifier and voltage comparator means;
said sensor being arranged in a geometrical pattern to develop from each sensor when the weapon is aimed and fired, a channel output signal indicative of hit or miss; and

a logic circuit for receiving the output signals of each sensor channel to produce from the combined sensor signals an ultimate output signal indicative of hit, miss, and specific area of near miss.

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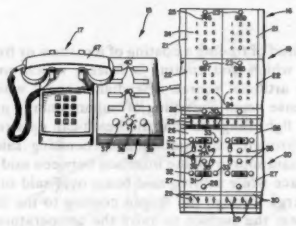
3,964,179

## TELEPHONE SYSTEM TEACHING APPARATUS

Stanley W. Bennett, 5227 Thunder Hill Road, Columbia, Md. 21045

Filed Nov. 7, 1974, Ser. No. 521,927
Int. Cl.² G09B 19/00
U.S. Cl. 35—31 R 5 Claims



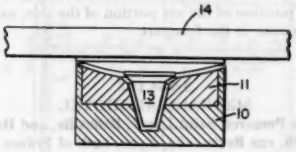
1. A teaching apparatus for use in teaching number discrimination, mathematical concepts, letter discrimination, reading and various verbal concepts, comprising a telephone switchboard having a plurality of signal display sections and a plurality of signal transmitting sections, a plurality of telephones each including a cradle and handset, electric circuits including switches electrially connecting each telephone to one of said signal display sections and to signal transmitting section associated with said signal display section, signal generating means connected to said electric circuits whereby when any telephone handset is removed from its cradle visual signals will be illuminated on the signal display section and the signal transmitting section associated therewith, a signal box associated with each telephone and electrically connected to the signal transmitting section thereof, said signal box having a plurality of light sources each disposed beneath an indicia bearing window, said signal transmitting section having a plurality of switches by which the light sources beneath said windows can be selectively energized for visually transmitting instructions to the student telephone user, said signal display section having symbols corresponding to the dialing symbols of the telephone and each associated with a light source electrically connected to said telephone symbol whereby the student telephone user can visually transmit to the student operator through said signal display section the designation of a telephone to be called, each of said transmitting sections having a plug and a jack whereby the student operator can remove the plug from the transmitting section connected with a calling telephone and apply it to the transmitting section connected to the telephone to be called, and a switch mounted on each transmitting section and connected to an audible and visual signal of the signal box associated therewith, said last mentioned switch being movable to one position for actuating the audible signal and thereafter to another position for actuating the visual signal of the signal box of the telephone being called.

3,964,180

## STANCE CONTROL SUPPORTS FOR, AND COMBINATION THEREOF WITH, A GOLF SHOE

Anthony M. Cortese, 327 Applehill Drive, Sagamore Hills, Ohio 44067

Filed Sept. 9, 1974, Ser. No. 504,545
Int. Cl.² A43B 5/00
U.S. Cl. 36—135 10 Claims




1. In combination with a golf shoe for the right foot and having a sole and spikes carried by the sole and protruding downwardly therefrom and arranged in inner and outer rows, respectively, extending from near the front of the sole to and including the heel of the shoe, and arranged in laterally spaced relation to the central portion of the shoe and heel with the inner row near the inner lateral limit of the sole and heel and the outer row near the outer lateral limit of the sole and heel;

stance control supports for the sole and heel;

each support being a relatively rigid body and having a cavity open through the upper face and in which an associated spike of said inner row is received in the installed position of the support, said lower face being of an area several times the area of the maximum cross section of the normal ground penetrating portion of the associated spike and each support, in installed condition, being in endwise load transmitting relation to its associated spike;

magnetic means carried by the upper portion of the body and magnetically cooperative with the associated spike and detachably holding the body in said installed position;

a plurality of said supports being installed on spikes, respectively of said outer row only; and

the inner row of spikes being free from said supports, and unobstructed so that they can normally penetrate into the ground.

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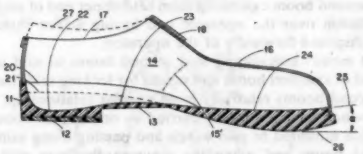
3,964,181

## SHOE CONSTRUCTION

Cressie E. Holcombe, Jr., 1613 Blackwood Drive, Knoxville, Tenn. 37921

Filed Feb. 7, 1975, Ser. No. 548,142
Int. Cl.² A43B 13/00
U.S. Cl. 36—91 5 Claims




1. A shoe construction for improving the posture of a wearer, which comprises:

a sole member having a top surface with an exposed perpiheral edge of substantially uniform thickness, the peripheral edge being more elevated at a heel portion of the sole than at a toe portion;

a heel integrally formed with the sole and depending therefrom at the heel portion to form a tread plane with the sole at the toe portion;

a bridge integrally formed with the heel and sole extending forwardly from the heel in a shank portion of the sole;

a shoe upper secured to the top surface of the sole at substantially the peripheral edge; and

wherein the top surface of the sole is provided with a longitudinal depression extending downwardly into the heel and forwardly into the bridge to a depth sufficient to create a foot-supporting surface inclined continously upwardly from the depression in the heel to a most forwardly position of the toe portion of the sole, said surface being planar in the forepart.

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**3,964,182**

**MECHANICAL SHOVEL**

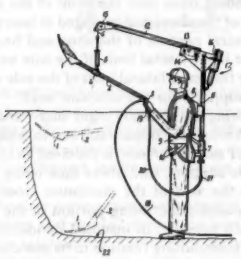
**Jean-Claude Pomeret, Saint.Lager, Belleville, and Henry Bonnevaux, 98, rue Bechevelin, Lyon, both of France**

**Filed Oct. 29, 1974, Ser. No. 519,000**

**Claims priority, application France, Oct. 31, 1973, 73.39465**

**Int. Cl.² E02F** *3/02, 3/46;* **A01B** *1/02;* **A01D** *11/00*

**U.S. Cl. 37—1** **4 Claims**



1. A mechanical shovel to be carried by and manipulated by an operator, said mechanical shovel comprising:

a harness to be carried by said operator and including a back plate which rests against the lower back of the operator, a pair of shoulder pieces which engage over the shoulders of the operator and straps which retain said back plate and said shoulder pieces on the torso of the operator, said straps including a ventral strap and a pair of leg straps which extend around the thighs of the operator;

a first substantially vertical boom mounted at its lower end on said back slate and secured by said harness onto the operator, said first boom having an upper end disposed above the head of the operator;

a second boom extending from said upper end of said first boom over the operator and having a free extremity disposed forwardly of the operator;

pivot means articulating said second boom to said upper end of said first boom and means for locking said first and second booms relatively in an angular relationship;

a winch having a motor carried by one of said booms;

a cable mounted to said winch and passing along said second boom and extending downwardly from said free extremity ahead of the operator to an end, and drawn in upon operation of said motor;

a digging tool having a ground-engaging working end, a handle extending from said working end, and a pair of spaced-apart handle grips secured to said handle remote from said working end;

means for securing said cable end to said handle intermediate said working end and said hand grips; and

control means on at least one of said hand grips for operating said motor.

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**3,964,183**

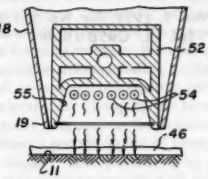
**METHOD AND APPARATUS FOR DETACHING COATINGS FROZEN ON TO SURFACES**

**Thomas W. Mouat, Vancouver, Canada, assignor to B. C. Research, Canada**

**Continuation of Ser. No. 321,721, Jan. 8, 1973, abandoned. This application June 4, 1974, Ser. No. 476,200**

**Int. Cl.² E01H** *5/10;* **E01C** *23/14*

**U.S. Cl. 37—12** **13 Claims**




1. The method of freeing a coating of ice, snow or frost from a surface to which said coating is frozen, which comprises providing an artificial source of radiant energy which produces an intense beam consisting of radiant energy primarily in the visible light range so that the beam can pass relatively unimpeded through said coating and focussing said beam produced by said source on the interface between said coating and said surface while moving said beam over said surface to transport energy through the frozen coating to the interface such as to heat the surface to raise the temperature of the interface above the freezing point of water to thereby disrupt the bond between the coating and the surface to detach the latter from the former, while substantially all of the material of said coating apart from that at said interface remains below its melting temperature.

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**3,964,184**

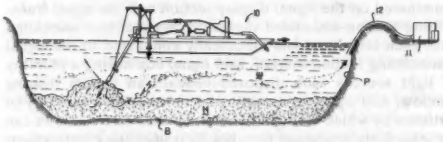
**METHOD OF REMOVING MATERIAL FROM A BED OF A BODY OF WATER**

**Thomas A. Mathieu, 2204 Justice, Office A, Monroe, La. 71201**

**Division of Ser. No. 373,140, June 25, 1973, Pat. No. 3,885,331. This application Apr. 21, 1975, Ser. No. 569,924**

**Int. Cl.² E02F** *3/88;* **B63H** *11/04*

**U.S. Cl. 37—195** **10 Claims**



1. A method of removing material from the bed of a pond, lake or like body of water utilizing a floating hull having a bow and stern comprising the steps of drawing water from the body of water at a point closely adjacent the hull, forming the drawn water into a plurality of generally parallel pressurized streams inclined to the horizontal and directed rearwardly from the stern, releasing the pressurized streams in the body of water at points substantially removed and generally equidistant from the hull and adjacent the material thereby creating a material-water admixture and simultaneously propelling the hull in a forward bow-leading direction, changing the distance of the last-mentioned points relative to the hull depending upon the distance of the material from the hull, forming the drawn water into two additional pressurized streams, selectively releasing one or both of the additional pressurized streams in the body of water at points sidewise removed from the hull

adjacent the bow and below the water surface for steering the hull during its forward bow-leading motion, selectively moving one or both of the additional streams to move the point or points of impingement thereof with the water along an arc materially outboard of the hull and having a center on said hull medially of sternmost and bowmost points of impingement of each additional stream, and withdrawing the material-water admixture from the body of water.

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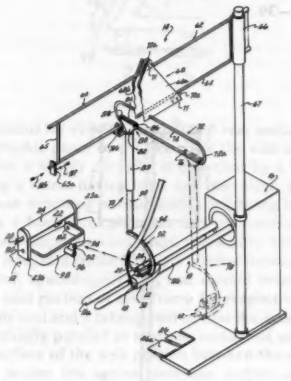
**3,964,185**

## SEAMBUSTING APPARATUS AND METHOD

**Norman J. Bullock, Prospect; Frank A. Wendt, Jeffersontown; Laddie A. DePas, Louisville, all of Ky., and Walter P. Goodman, New Albany, Ind., assignors to W. M. Cissell Manufacturing Company, Louisville, Ky.**

**Filed July 31, 1975, Ser. No. 600,827**
**Int. Cl.² D06F *69/00***
**U.S. Cl. 38—14** **12 Claims**



**1.** Apparatus for opening and flattening a seam having mating edges of fabric joined together along an elongated seam line, comprising:

an elongated buck having a convex outer surface adapted to support the seam with the mating fabric edges thereof outboard, said buck having an outer free end over which said fabric is drawn in the process of dressing said seam on said convex outer buck surface, said outer free end provided with a smoothly contoured notch therein oriented to guide said seam to a position atop said convex outer buck surface as said fabric is drawn over said buck in said dressing process, and

an iron having a sole plate including a central elongated bottom surface region terminating at a forward edge in a pointed nose configuration to spread apart and thereby open the mating fabric edges of a seam when moved forwardly thereover along the seam line thereof, said central elongated bottom surface region having a length substantially less than the length of said buck and being concavely configured to correspond to said convex outer buck surface for overbusting a seam, which is sandwiched therebetween with the melting edges thereof adjacent said sole plate, by pressing said edges to form an angle along said seam line which substantially exceeds 180°,

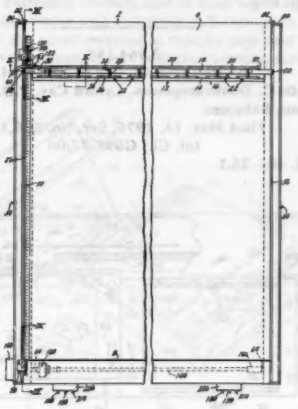
said convex and concave surfaces each having a radius of curvature of less than approximately two inches and more than approximately one-half inch to facilitate appreciable overbusting and avoid spring-back while minimizing criticality in alignment of said seam line on said buck.

**3,964,186**

## POWERED DRAPERY TABLE

**Robert V. Strickland, 9021 Wedd, Overland Park, Kans. 66212**

**Filed June 27, 1975, Ser. No. 591,142**
**Int. Cl.² D06C *3/08***
**U.S. Cl. 38—102.1** **15 Claims**



**1.** A drapery table comprising:

a. a rectangular planar table top having front, rear and side edges,

b. a straight clamp bar extending across said table top at right angles to its side edges,

c. a series of clamp devices carried by said clamp bar at intervals along its length, and operable to secure an edge of a sheet of drapery fabric to said clamp bar,

d. a pair of drive units carried respectively at the opposite side edges of said table top and each including a drive member movable in a direction parallel to the associated side table edge,

e. power means operable to move said drive members selectively and concurrently in either direction in their lines of travel, and

f. a connector joining each of said drive members to the adjacent end of said clamp bar, whereby said drive units move said clamp bar transversely of itself.

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**3,964,187**

## ADJUSTABLE COIN DISPLAY DEVICE

**Elmer J. Stumpf, Los Angeles, Calif., assignor to Beemak Plastics, Los Angeles, Calif.**

**Filed May 16, 1975, Ser. No. 578,022**
**Int. Cl.² G09F *3/02***
**U.S. Cl. 40—27.5** **4 Claims**

**1.** An adjustable coin display device comprising an annular split ring having a set diameter yet yieldable to an enlarged annular diameter, said ring including an annular coin receiving means adapted to engage the peripheral edge of a coin; a

suspension means extending from said annular split ring whereby said last means may be engaged to suspend said device so that both faces of said coin may be viewed,

said annular split ring including spaced apart aligned ends when in said set diameter position and when said ring is yieldable to an enlarged annular, diameter position,

said suspension means bridging said aligned ends of said split ring.

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**3,964,188**

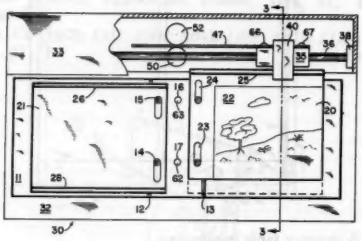
**AUDIOVISUAL BOOK SYSTEM**

**Panayotis C. Dimitracopoulos, Lyford Cay, P.O. Box N-7776, Nassau, Bahamas**

**Filed Mar. 14, 1975, Ser. No. 556,321**

**Int. Cl.² G09F *27/00***

**U.S. Cl. 40—28.1** **10 Claims**



1. An audiovisual book including:

a. book-cover means substantially similar to a loose-leaf binder;

b. at least one audiovisual sheet having an area wherein visual information may be placed and an audio information track disposed about a linear axis, said sheet also having at least one elongated perforation, said elongated perforation having a lengthwise axis substantially perpendicular to said linear axis;

c. binder means on said book-cover means passing through said elongated perforation retaining said sheet but also allowing it to be displaced along said lengthwise axis.

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**3,964,189**

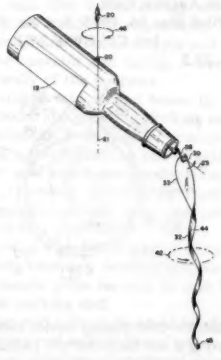
**ADVERTISING DISPLAY**

**Paul Belokin, Jr., Rte. 4, Hayward, Wis. 54843**

**Continuation-in-part of Ser. No. 507,711, Sept. 20, 1974, abandoned. This application Sept. 8, 1975, Ser. No. 611,237**

**Int. Cl.² G09F *19/10***

**U.S. Cl. 40—33** **12 Claims**



1. An animated display device comprising:

an object to be displayed;

overhead suspension means for supporting said object for rotation about a vertical axis;

motor means carried by said object providing a rotatable shaft extending therefrom for rotation about a second axis spaced from and eccentric to said vertical axis; and

elongated flexible ribbon means connected to and depending from said shaft for rotation by said motor means, the lateral portions of the ribbon means adjacent the shaft having an effective area diameter and leverage on the shaft against the surrounding air when moving through an arc remote from the vertical axis than when moving nearest the vertical axis for moving the shaft to rotate said object about the vertical axis.

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**3,964,190**

**ADVERTISING DISPLAY DEVICE**

**Daniel W. Leo, 322 S. Merrick Ave., Merrick, N.Y. 11566**

**Filed May 30, 1975, Ser. No. 582,180**

**Int. Cl.² G09F *11/02***

**U.S. Cl. 40—39** **1 Claim**

1. An advertising display device comprising: a relatively fixed support element including a vertically disposed pole having an upper end, a rotating element supported by said pole upon said upper end for rotation thereon about a vertical axis; said rotating elment including a cylindrical wall having an outer surface for the display of advertising indicia thereon, and an upper planar wall engaging an inner surface of said cylindrical wall; vein means extending from said cylindrical wall; said upper wall having a centrally disposed magnet thereon, and means concentrically disposed with respect to said magnet defining a conical recess; the upper end of said pole having a second coaxially disposed magnet thereon, and a pin coaxially disposed relative to said second magnet extending upwardly therefrom, whereby engagement of said pin within said recess serves to provide a self-centering supportive action; said first and second magnets being arranged to present adjacent surfaces of like polarity whereby the magnetic repelling action existing therebetween lessens the effective weight supported by said pin, and correspondingly reduces rotational friction of said rotating element.

3,964,191

## APPARATUS FOR SIMULTANEOUS VIEWING OF BOTH SIDES OF WEBS OF PHOTOGRAPHIC PAPER OR THE LIKE

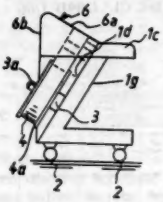
**Werner Sieber, Munich; Friedrich Ganser, Feldkirchen; Thomas Hammer; Wolfgang Viehrig, both of Munich; Hans-Dieter Frick, and Viktor Osegowitsch, both of Taufkirchen, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany**

**Filed Sept. 24, 1975, Ser. No. 616,412**

**Claims priority, application Germany, Sept. 26, 1974, 2445996**

**Int. Cl.² G09F *11/29***

**U.S. Cl. 40—86 A** **17 Claims**




**1.** Apparatus for viewing of front and rear surfaces of a web of photographic paper or the like while the web is being withdrawn from a supply reel and is collected by a takeup reel, comprising a frame having front and rear sides; a light-transmitting pane mounted on said frame and being inclined with respect to a horizontal plane so that one surface thereof is exposed and slopes upwardly and rearwardly with respect to said front side, said frame having a portion located at the rear side thereof; spaced-apart first and second rotary mounting means on said portion of said frame for respectively supporting a supply reel and a takeup reel so that the axes of the reels are substantially parallel to said one surface of said pane and the rear surface of the web portion between the reels on said mounting means lies against said one surface of said pane whereby the front surface of such web portion is observable from the front side of said frame; and mirrors mounted on said frame behind said pane for imaging the rear surface of said web portion so that the image of said rear surface of said web portion is observable through said pane from the front side of said frame.

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3,964,192

## REFERENCE INDEXING DEVICE

**Tsutomu Nonaka, 1-30-16-703, Hongoh, Bunkyo, Tokyo, Japan**

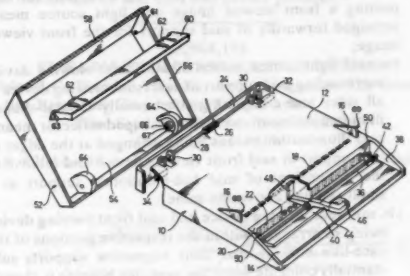
**Filed Dec. 27, 1974, Ser. No. 536,980**

**Claims priority, application Japan, Apr. 10, 1974, 49-40781**

**Int. Cl.² G09T *11/06***

**U.S. Cl. 40—104.01** **4 Claims**

**1.** In a card indexing device which includes a base member, means for supporting a stack of cards, at least one card selection lever arm pivotably mounted at the front portion of the base member and having a plunger at one end thereof positioned below the front portions of the cards and a push button at the other end thereof whereby actuation of the push button serves to pivot the plunger upwardly into engagement with the cards juxtaposed thereabove and lift such cards, a cover member pivotably connected at the rear end thereof to said base member and including a top wall and a depending front wall, means for biasing the card selection lever arm such that the push button is urged upwardly, means for releasably locking said cover member and base member, and means for applying an upwardly directed biasing force to said cover member tending to urge the cover member into an open position, the improvement comprising: at least one guide tab projecting upwardly from said card support means and having a forward camming surface including a lower vertical portion and an upper rearwardly and upwardly inclined portion; and a substantially L-shaped card hanger pivotably mounted in said cover member in close proximity to the front wall thereof, said card hanger including a generally vertically extending portion having at least one forwardly projecting tongue element struck from the material thereof and an inwardly directed lip portion at the lower extremity thereof, said at least one tongue element being cooperable with said front wall during the upward movement of the cover member to thereby urge said lip portion into camming engagement with the camming surfaces of



said at least one guide tab to position the lip portion beneath the front portion of the cards lifted by said plunger for support of such cards during the continued upward movement of the cover member, said at least one tongue element being engageable with the front wall to limit the clockwise pivotal movement of the card hanger when the cover member is in a fully open position such that said lip portion is engageable with the camming surfaces of said at least one guide tab during downward movement of the cover member for guidance of the card hanger into a depending position in front of the stack of cards when the cover member is in its closed position.

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3,964,193

## APPARATUS FOR SIMULTANEOUSLY VIEWING DIAPOSITIVES AND FRONT VIEWED PICTURES

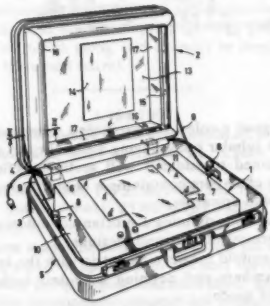
**Günter Degenhardt, Heidelberg, and Tino Celio, Ambri, Switzerland, assignors to Gretag Aktiengesellschaft, Regensdorf, Switzerland**

**Filed Dec. 23, 1974, Ser. No. 535,821**

**Claims priority, application Switzerland, June 28, 1974, 8928/74**

**Int. Cl.² G09F *13/10***

**U.S. Cl. 40—106.1** **3 Claims**



**1.** An apparatus for simultaneously viewing diapositives and front viewed images, especially transparent printed copies and

prints produced therefrom, under standardized illumination conditions, comprising

a. a case-like housing having a cover portion and a floor portion and means for hingedly interconnecting said two portions and for selectively fixing said two portions in an adjustable mutual angular position relative to one another;

b. a rear viewing device being arranged in one of the housing's portions and incorporating a support for supporting a transparent image and light source means arranged behind said support; and

c. a front viewing device being arranged in the other of the housing's portions and incorporating a support for supporting a front viewed image and light source means arranged forwardly of said support for the front viewed image;

ca. said light source means of said front viewing device surrounding said support of said front viewing device at all sides and comprising substantially tubular-shaped illumination means and trough-shaped reflector means, said illumination means being arranged at the edges of the support of said front viewing device and relative to the dimensions of said last-mentioned support at a small spacing above the same;

cb. said rear viewing device and said front viewing device being so arranged within the respective portions of the case-like housing that their respective supports substantially coincide when the case-like housing is closed.

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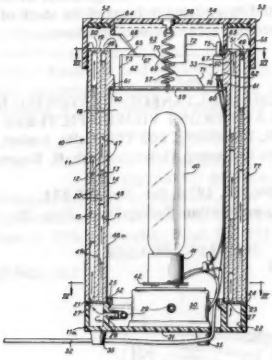
**3,964,194**

## CHANGEABLE COLOR DISPLAY DEVICE

**William G. Gugeler, 200 S. Vance, Lombard, Ill. 60148**

**Filed Jan. 22, 1975, Ser. No. 543,116**
**Int. Cl.² G09F *13/24***
**U.S. Cl. 40—106.21** **18 Claims**



1. A changeable color display device, comprising:

an upright tubular body having a plurality of differentially dimensioned translucent wall sections defining upright working chambers containing a liquid through which air can bubble upwardly;

said tubular body defining a substantial hollow space within the innermost of said wall sections;

annular manifold means concentric with the lower ends of said chambers and defining a central bottom opening from said space;

a base structure accessible through said opening;

means on said base structure for supplying air under pressure into said manifold;

orifices communicating said manifold with the lower ends of said chambers for intruding bubble air into the liquid material in the chambers;

a head sealing the upper ends of the chambers and having air venting ports opening therefrom;

and means supported by said base and carrying a selectively operable source of illumination extending upwardly in said space within the tubular body.

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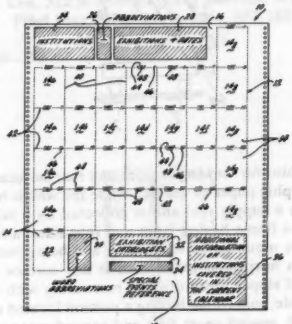
**3,964,195**

## EVENT CALENDAR

**Mary Ann McClurkin Jordan, 2165 Fern Dell Place, Los Angeles, Calif. 90068**

**Filed Apr. 25, 1975, Ser. No. 571,807**
**Int. Cl.² G09D *3/00***
**U.S. Cl. 40—107** **6 Claims**



1. An event calendar, said calendar comprising:

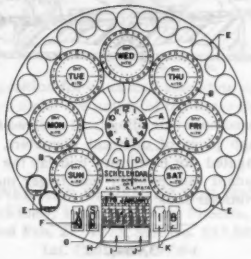
A. a rectangular sheet of paper upon which are arranged rows, vertically aligned, of defined rectangular spaces, each representing one of the days in a given month, or part thereof, on a weekly basis in block form with the spaces representing Sundays disposed on the left side, and Saturdays, on the right side, of the array and the defined spaces representing each of the other five days of the week disposed in order horizontally between the Sunday and Saturday spaces in a conventional monthly calendar format; each of the rectangular spaces representing a Sunday having on its left side a sequence of designator numbers, one for each line from top to bottom of said space, one line or a portion thereof being provided for each event or exhibition to be described; there being provided on each said line commencing in the rectangular Sunday space in each row of spaces after the date when an event has opened, an abbreviated description of the event extending continuously on the same line in the remainder of the rectangular spaces in the same row and on a corresponding line in each subsequent row of spaces through the space representing the date when the event closes, and repetitively to the extent said abbreviated description does not extend through all of the last said spaces; and each space representing a day when a site, or event is not open being appropriately marked so to indicate such fact; said description of the event and the site at which it is held utilizing abbreviations, acronyms and-/or code symbols; and

B. at least one free area on said rectangular sheet outside of said array of spaces, but in the vicinity thereof, in which area information relating to events, and/or sites described in the spaces constituting said array, is further detailed with references to the abbreviations, acronyms or code symbols utilized in said spaces to describe the events and sites and the time periods during which they are open for attendance or closed.

## 3,964,196
## SCHELENDAR

Luis A. Ureta, 1116½ S. Menlo Ave., Los Angeles, Calif. 90006

Filed June 4, 1975, Ser. No. 570,275
Int. Cl.² G09D 3/00
U.S. Cl. 40—107 4 Claims

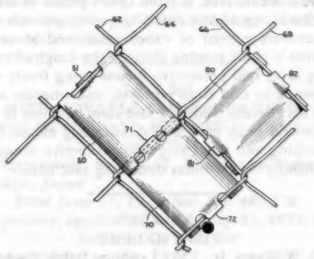



1. An activity schedule display device comprising: a display board having seven discrete schedule areas thereon, each schedule area having indicia thereon representing a different day of the week and each schedule area further having indicia representing the time in hourly increments from beginning to end of the day each of said increments being associated with engaging means, said board further having a plurality of discrete activity indicating areas thereon each provided with both a pictorial and a symbolic representation of an indicated activity; a plurality of activity pin-like elements each having a symbolic representation of an indicated activity on one side thereof, and means on the opposite side whereby each of said elements is adapted to engage with a selected one of said engaging means; and, a clock is mounted on said board, whereby, the clock permits correlation between a time frame and an indicated activity.

## 3,964,197
## VERSATILE OUTDOOR SIGN

Robert F. Tucker, deceased, late of Cassleberry, Fla., and Ruth L. Tucker, executrix, 291 Lake Griffin Circle, Cassleberry, Fla. 32707

Filed June 24, 1974, Ser. No. 482,504
Int. Cl.² G09F 7/02
U.S. Cl. 40—125 E 24 Claims

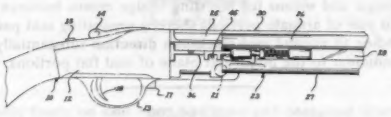


1. A self-locking chip usable on a wire mesh with a number of other like chips in order to display intelligence, which mesh has numerous apertures of essentially square configuration therein to receive such chips, a given chip having a pair of oppositely disposed attachment edges configured to engage opposite sides of a given aperture in locking relationship, each attachment edge involving a tab located between a pair of corner portions, with such tab being bent out of the plane of said corner portions such that said tab can engage a different side of the contacted wire of a wire mesh than do the respective corner portions, the dimension of said chip measured between said attachment edges being slightly greater than the distance between corresponding sides of the aperture in which the chip is to be installed, said chip being of resilient material, and possessing a considerable amount of stiffness, but nevertheless being flexible enough to be able to be bent by finger pressure to an extent sufficient to materially decrease the distance between its attachment edges, said chip, when in such bent condition, being able to be inserted in a selected aperture in the mesh, and when released therein, returning to its normal length condition and becoming locked into such aperture by the interaction of said tabs and corner portions.

## 3,964,198
## FIREARM EXTRACTOR/EJECTOR SYSTEM

Richard G. Waddell, Phoenix, Ariz., assignor to The Innovation Resources Corporation, Tempe, Ariz.

Filed Sept. 5, 1974, Ser. No. 503,299
Int. Cl.² F41C 15/06
U.S. Cl. 42—48 4 Claims



1. In a break-open type firearm action having a barrel and using a gas propelled projectile fired from a cartridge held in a breech of said barrel, an extraction/ejection system comprising:

a. an extractor/ejector slidably positioned along the breech of said barrel for longitudinal movement along said barrel and including a portion thereof positioned to engage said cartridge for extracting or ejecting said cartridge from the breech of said barrel;

b. an extractor/ejector spring contacting and urging said extractor/ejector to an extracting position when said action is broken;

c. sear means for latching said spring in an energy storage position, said sear means responsive to the breaking of said action for unlatching said spring and permitting said spring to rapidly force said extractor/ejector rearward of said barrel to effectively eject said cartridge from said breech;

d. a cylinder secured to said barrel;

e. a piston slidably mounted in said cylinder;

f. a gas port in said barrel communicating with said cylinder for transporting gas under pressure from said barrel during firing of said cartridge to said cylinder to force said piston along said cylinder;

g. means connected to said piston and contacting said sear for forcing said sear to a spring latching position when said piston moves along said cylinder in response to gas pressure from said barrel.

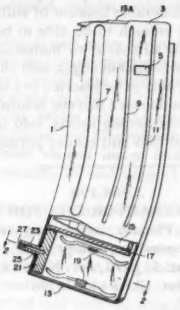
## 3,964,199
## ADJUSTABLE SPRING ASSEMBLY

Daniel D. Musgrave, 8201 Caraway St., Cabin John, Md. 20731

Filed June 2, 1975, Ser. No. 582,772
Int. Cl.² F41C 25/02; F16F 1/22
U.S. Cl. 42—50 10 Claims

10. A firearm magazine comprising: a case for storing cartridges having a pair of lips with an exit port therebetween; a floor; a follower for engaging said cartridges; an adjustable spring assembly positionally adapted for engaging said follower and for reacting against said floor and comprising, a stack of interleaved folded leaf springs each having a pair of parallel flat portions extending from a pair of nested arcuate

portions connected by a vertex, each successive spring being positioned with its vertex disposed at an opposite end of said stack, means for engaging each interleaved flat portion of one of said springs with an adjacent flat portion of another of said



springs, and means for inserting wedge means between each said pair of arcuate portions thereby separating said pair and tending to expand said stack in a direction substantially perpendicular to the major flat plane of said flat portions.

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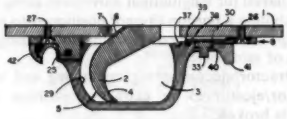
**3,964,200**
**LOCKING TRIGGER GUARD**

**Leslie A. Patterson, 565 Sagamore Ave., Apt. 15, Portsmouth, N.H. 03801**

**Filed Apr. 7, 1975, Ser. No. 565,341**
**Int. Cl.² F41C** *17/02, 27/10*
**U.S. Cl. 42—70 E** **10 Claims**



1. A locking mechanism for a firearm having a frame and having a movable trigger depending from the firearm frame, said mechanism comprising:

an elongated base plate attachable to the firearm frame;

a locking member carried by said base plate having an upper portion being in longitudinal sliding engagement with said base plate, and a lower portion comprising a trigger guard enclosing the trigger in the plane of motion of the trigger, said locking member being movable between a forward locked position wherein the trigger guard blocks the rearward motion of the trigger, and a rearward unlocked position allowing full motion of the trigger; and

latch means cooperating with the locking member to releasably engage the locking member in the locked and unlocked positions.

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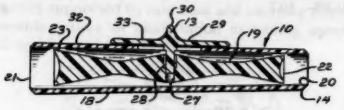
**3,964,201**
**FISH BAIT DEVICE AND METHOD**

**Leo Biliunas, 926 Hickory Lane, Darien, Ill. 60559, and Allan SunPano, 4101 W. Parker St., Chicago, Ill. 60639**

**Filed Mar. 28, 1975, Ser. No. 562,908**
**Int. Cl.² A01K** *97/04*
**U.S. Cl. 43—4** **1 Claim**

1. A device for baiting fishhooks comprising a relatively elongated tubular member having at least one open end, a plunger mounted in said member for slidable movement longitudinally thereof from a first position removed from said one end to adapt said tubular member to receive fish bait dough to a second position adjacent said one end for ejecting said fish bait dough, an opening in said tubular member, and finger manipulatable means on said plunger extending through said opening, said tubular member being open at both ends and



having a tapered bore extending from one end to the other to produce dough plugs of different diameters, said opening being an elongated slot positioned midway the length of said member to adapt said plunger and finger means to move toward both tubular ends.

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**3,964,202**
**FISHING LURE**

**Aaro Arvo Ruppa, Konhionkatu 75, Jyvaskyla, Finland**

**Filed May 20, 1975, Ser. No. 579,328**
**Int. Cl.² A01K** *83/00*
**U.S. Cl. 43—42.1** **4 Claims**

1. Improved fishing lure, comprising pointed hooks having stem portions and projecting in different directions; protective means which prevent said hooks from catching on plants, stones and other underwater obstacles; said protective means consisting of a body part having an aperture admitting the passage of said stem portions, and of elongated, elastic protective members attached by one end to said body part, and which members project from said body part in different directions to the sides thereof, in front of the points of said hooks, and constituting an elastic catching guard; wherein said protective members consist of vanes positioned at an oblique angle against a plane passing through the longitudinal axis of the fishing lure; said protective means being freely rotatable with reference to said stem portions; and wherein said body part has a slit therein, allowing said stem portions to be introduced into said body part, and constituting means for selectively attaching and detaching said protective means to and from the fishing lure without detaching said hooks.

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**3,964,203**
**FISHING LURE**

**William O. Williams, Jr., 1309 Lynhurst Drive, Gastonia, N.C. 28052**

**Filed Jan. 27, 1975, Ser. No. 544,036**
**Int. Cl.² A01K** *85/00*
**U.S. Cl. 43—42.02** **9 Claims**

1. A fishing lure comprising a strip of material having toughness, flexibility, and blood particle absorption and exudation characteristics similar to chamois, said material being impregnated with a water soluble fish attracting substance such as animal blood that exudes slowly from said material during use of the lure in water to combine with the appearance and action of said strip of material for enhanced fish attraction,

and said strip having a curved flat tail portion that is capable of movement during use in water from a flat disposition to a

contoured disposition for enhanced exudation of the impregnated substance under the action of the water thereagainst in a fish attracting action.

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**3,964,204**

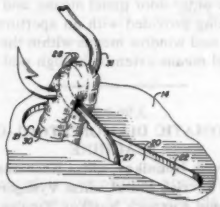
**CONTAINER AND DISPENSER FOR FISH BAIT**

**Francis W. McKinley, 1421 W. Colter, Phoenix, Ariz. 85013**

**Filed Feb. 27, 1975, Ser. No. 553,682**

**Int. Cl.² A01K** *97/04*

**U.S. Cl. 43—55** **5 Claims**



**1.** A container for storing a quantity of fish bait and for singularly dispensing and holding said bait while a fishhook is passed therethrough, said container comprising:

a. an enclosure for holding said quantity of bait and including a pair of spaced end walls, an elongate generally arcuate side wall extending between said end walls and an openable cover;

b. means defining an aperture in said cover;

c. an elongate shaft extending between said end walls and rotatably journalled therein;

d. cranking means for rotating said shaft; and

e. an arm extending radially from said shaft and rotatable therewith and having an end extendable beyond said cover for engaging said bait and lifting said bait through said aperture means.

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**3,964,205**

**FIGURE WITH MOVABLE TRUNK, HEAD ETC., HAVING DRIVING DEVICE AND INDIVIDUAL OPERATION MEANS**

**Shigeaki Kuramochi, No. 24-17, Kolshikawa 5-chome, Bunkyo, Tokyo, Japan**

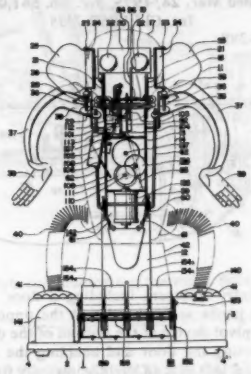
**Filed June 17, 1974, Ser. No. 480,278**

**Claims priority, application Japan, Aug. 23, 1973, 48-93892**

**Int. Cl.² A63H** *13/00*

**U.S. Cl. 46—120** **3 Claims**

**1.** A motion-toy comprising a fixed frame, a movable frame having a trunk and mounted movably freely with respect to said fixed frame, a head-frame having a head and mounted rotatably freely on said movable frame, an eye-frame having eyes and mounted rotatably freely on said head-frame, arms mounted rotatably freely at both sides of said movable frame, a driving device for moving up and down said movable frame, operation means for operating with said driving device to operate said trunk, head, eyes and arms respectively in association with said up and down movements of said movable frame, and respective operating devices for operating selectively each of said operation means, said operation means comprising an operating plate supported movably freely up and down by said fixed frame and having an operating part engaging with an engaging portion provided on said movable frame in a down position, an operating framework mounted



rotatably freely on said movable frame and energized downwards so as to contact with said operating part of the operating plate, interlocking levers connected rotatably freely between the base portions of said arms and said operating framework, and said operating devices including an individual operating device for moving up and down said operating plate.

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**3,964,206**

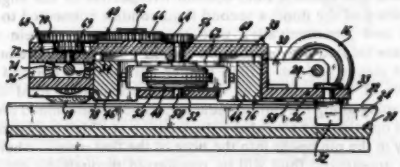
**MINIATURE VEHICLE WITH MAGNETIC FORCE**

**Robert Bernhard, Hollywood, Calif., assignor to Aurora Products Corporation, West Hempstead, N.Y.**

**Filed Feb. 3, 1975, Ser. No. 546,523**

**Int. Cl.² A63H** *33/26*

**U.S. Cl. 46—251** **11 Claims**



**1.** In a miniature, electrically powered vehicle of the type having an electric motor operatively connected to driving wheels on the vehicle and energized through a pair of electrical pick-up shoes and a track having electric power means therein and engageable with said pick-up shoes, the improvement comprising:

a. a pair of permanent magnets mounted in said vehicle forming the stationary magnetic portions of the electric motor of said vehicle;

b. said pair of magnets extending downwardly to a distance above said power means in the range of approximately 0.00 to approximately 0.02 inches;

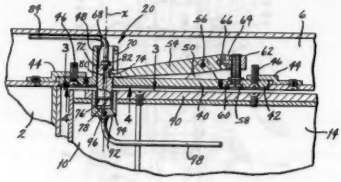
c. said electric power means being formed of magnetic material; and

d. said magnets and said power means providing a magnetic force urging said vehicle downwardly toward said track to provide increased normal force on said car against said track thereby providing increased driving traction between said wheels and said track.

## 3,964,207
## PIVOT ARRANGEMENT FOR TRANSFERRING PRESSURIZED AIR INTO A PIVOT DOOR

**Francis C. Peterson, St. Louis County, Mo., assignor to C. Hager & Sons Hinge Manufacturing Company, St. Louis, Mo.**

**Filed Mar. 24, 1975, Ser. No. 561,048**
**Int. Cl.² E05D 7/08**
**U.S. Cl. 49—388** **4 Claims**



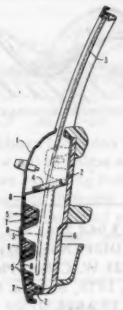
1. In an entry structure including a door frame having spaced apart jambs and a header at the upper ends of the jambs, and a pivot device at the bottom of the door, the pivot device supporting the door and enabling the door to pivot about a vertical axis spaced slightly inwardly from one of the jambs, the improvement comprising: first means on the door at the upper end thereof defining a vertical bore which opens upwardly out of the door and having an opening therethrough, said opening communicating with said bore; a first fluid conduit connected with said opening in said first means so as to communicate with the bore, the first conduit leading to a fluid operated appliance on the door; second means on the header defining a vertical bore which is fixed in position with respect to the header and opens downwardly, the axis for the vertical bore of the second means being coincident with the axis of rotation for the door; a pin received in the bore of the second means and projecting downwardly therefrom into the bore of the first means so that the two bores are coaxial, the pin having a passageway extending axially through it with the lower end of the passageway opening into that portion of the bore in the first means which is located below the pin so that the passageway always communicates with the bore in the first means and the first fluid conduit irrespective of the angular position of the door; a second fluid conduit connected to the pin and communicating with the passageway therein seal means located between the pin and the walls of the bore in the first means to form a fluid barrier between the pin and the walls of that bore so as to prevent pressurized fluid from escaping along the pin, the seal means being positioned above said opening and also above the location at which the passageway in the pin opens into the bore of the first means, whereby the pressurized fluid will be transferred through the pin and into the second conduit without loss of pressure at the pin; and means for retracting the pin from the bore of the first means to free the upper end of the door from the header.

## 3,964,208
## DOOR FOR VEHICLE, ESPECIALLY PASSENGER MOTOR VEHICLE

**Hermann Renner, Magstadt, and Dieter Weidemann, Weil der Stadt, both of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany**

**Filed May 28, 1975, Ser. No. 581,958**
**Claims priority, application Germany, June 1, 1974, 2426705**
**Int. Cl.² B60J 1/17**
**U.S. Cl. 49—502** **16 Claims**

1. A door for vehicles which comprises an outer door panel means and an inner door panel means, and which is equipped with a lowerable window means, characterized in that the inner door panel means extends through the plane formed by the lowered window in such a manner that above the place where it extends through said plane, the inner door panel means is disposed on the side of said plane facing the interior space of the vehicle and below this place, on the side of said

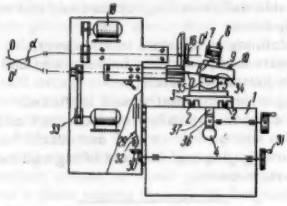


plane facing the outer door panel means, and said inner door panel means being provided with an aperture means for the windowpane of said window means within the area where the inner door panel means extends through said plane.

## 3,964,209
## SEMIAUTOMATIC DIAMOND TOOL-GRINDING MACHINE

**Mikhail Naumovich Konnikov, ulitsa Kosmonavtov, 5, kv. 35, Vitebsk; Ivan Savvich Nakul, ulitsa Vyshgorodskaya 33, kv. 35, Kiev; Leonid Kuzmich Novikov, Smolenskoe shosse, 58, kv. 49, Vitebsk; Evgeny Stepanovich Zemlyansky, ulitsa Osipovskogo, 13, kv. 14, and Peter Tankhomovich Shulman, ulitsa Dorogozhitskaya, 26, kv. 58, both of Kiev, all of U.S.S.R.**

**Filed Mar. 12, 1974, Ser. No. 450,497**
**Int. Cl.² B24B 3/34**
**U.S. Cl. 51—5 R** **4 Claims**



1. A semiautomatic diamond tool-grinding machine for tools having a holder fitted with a hard-alloy element, comprising: a base (1); a work table (3) on said base; drive means (4) kinematically linked with said table for reciprocating the same; means (5) for setting a tool (e.g. 10) to be ground, installed on said table at an angle ensuring a preset rear cutting angle therefor; means (6) secured to said table for automatically clamping and releasing the tool; a flexible element (28) installed on said table; a horizontally displaceable stop (19) for adjusting the amount of cut-off allowance removed from the rear surface of the tool, said stop contacting the front surface of the tool by biasing the latter toward said flexible element; a grinding head (17) installed on said base and having a spindle; drive means (18) for rotating the latter; diamond wheels (20, 21) fixed to said spindle, one (20) of said wheels serving to grind a hardalloy element (e.g. 15) over its rear surfaces, and the other wheel (21) to grind a chip-breaking groove for the tool, said wheels being installed with freedom of adjusting the distance between them; and a milling head (22) installed on said base for dressing a tool holder (e.g. 14)

and having a spindle whose geometrical axis is inclined in relation to that of said spindle of the grinding head.

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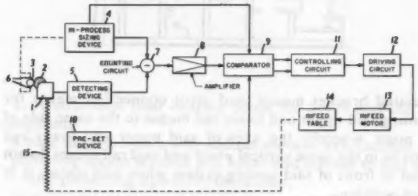
**3,964,210**

## GRINDING APPARATUS

**Sadao Moritomo, Ichikawa, Japan, assignor to Seiko Seiki Kabushiki Kaisha, Japan**

**Filed Sept. 27, 1974, Ser. No. 509,851**
**Claims priority, application Japan, Oct. 1, 1973, 48-110371**
**Int. Cl.² B24B *49/04***
**U.S. Cl. 51—165.71** **4 Claims**




**1.** A grinding apparatus comprising, presetting means to preset a reference signal having a value varying in time and corresponding to a desired size of a workpiece at points in time as the workpiece is ground, size-sensing means for sensing the varying size of the workpiece and developing an output signal having values corresponding to the varying size of the workpiece being ground, infeed means for infeeding a grinder to said workpiece for grinding thereof, detecting means for detecting the infeed of the infeed means to said workpiece and developing an output signal representative of the infeed speed of the grinder to the workpiece, a reduction rate-determining circuit receptive of the output signal of the size-sensing means and the output signal of the detecting means for developing a deviation signal representative of the reduction rate of the workpiece while being ground, a comparator circuit receptive of the preset reference signal, the deviation signal and the output signal of said size-sensing means for developing a difference signal when a difference obtained between the deviation signal representative of the reduction rate and the reference signal, and means comprising a control circuit for controlling the rate of feeding of the infeed means to maintain the deviation signal corresponding to a reduction rate signal equal to the reference signal, thereby to control the grinding of the workpiece to maintain the desired infeed speed of said infeed means.

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**3,964,211**

## STONE WEAR INDICATION ON A HONING MACHINE

**Robert C. Engle, Holland, Mich., assignor to Ex-Cell-O Corporation, Troy, Mich.**

**Filed July 31, 1975, Ser. No. 600,697**
**Int. Cl.² B24B *49/00***
**U.S. Cl. 51—165.87** **10 Claims**

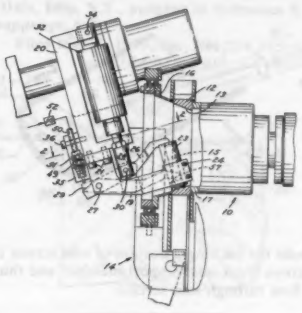
**1.** In a honing machine having an abrasive mounted to automatically feed by action of a lever in conjunction with a feed cylinder and a fluid operated stone wear indicator switching apparatus comprising:

a. a lever pivotally mounted to contact said abrasive in said feed cylinder and a plunger;

b. said plunger disposed in a valve body with rod end of said plunger extending therefrom;

c. said plunger making a seal against said valve body; and

d. communication conduit between said valve body and



pressure switch communication thereto a fluid pressure supply.

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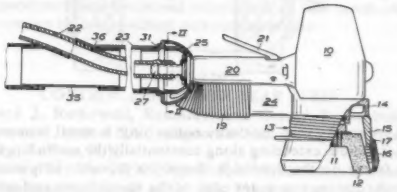
**3,964,212**

## PNEUMATIC GRINDING MACHINE PROVIDED WITH DUST REMOVING MEANS

**Karl Gösta Kårdén, Nacka, Sweden, assignor to Atlas Copco Aktiebolag, Nacka, Sweden**

**Filed Mar. 10, 1975, Ser. No. 557,116**
**Claims priority, application Sweden, Mar. 22, 1974, 74038837**
**Int. Cl.² B24B *23/00***
**U.S. Cl. 51—170 PT** **13 Claims**



**1.** Dust removing device for a hand held pneumatic grinding machine, comprising:

a machine housing carrying a rotatable grinding tool,

a dust collector which is attached to the machine housing and arranged to at least partly surround the grinding tool, and means for coupling a pressure air supply conduit to the machine and a dust conveying conduit in communication with said dust collector,

the improvement wherein said coupling means comprises swivel means for rotatably coupling the dust conveying conduit and the pressure air supply conduit to the machine with the dust conveying conduit and the pressure air supply conduit substantially coaxial with each other and rotatable about a common axis relative to the machine.

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**3,964,213**

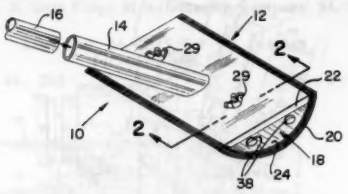
## ABRASIVE CLEANING TOOL

**Alton E. Tobey, 2203 Mission St., Santa Cruz, Calif. 95060**

**Filed Mar. 17, 1975, Ser. No. 559,328**
**Int. Cl.² B24D *15/04***
**U.S. Cl. 51—392** **10 Claims**

**10.** A cleaning tool comprising a handle element and a coupled head assembly including a substantially rigid screen support member, a wire mesh screen having a limited degree

of flexibility, said screen having a plurality of abrasive particles attached thereto, and means for locally attaching said screen to said support member, said screen support member




having means for backing a portion of said screen by displacing said screen from said support member and thus allowing matter to flow through said screen.

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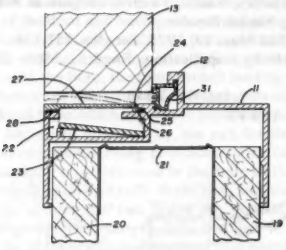
**3,964,214**

## SMOKE STOP

**Alan C. Wendt, Barrington, Ill., assignor to United States Gypsum Company, Chicago, Ill.**

**Filed June 25, 1975, Ser. No. 590,247**
**Int. Cl.² E04H *9/00***
**U.S. Cl. 52—1** **7 Claims**




**1.** A smoke stop for doors comprising: a metal frame with a slot therein extending along substantially the entire length of the frame on the door side thereof; a movable lid pivotably attached along one outer edge of the metal frame and releasably attached to a second outer edge of the metal frame thereby completely enclosing the slot in the metal frame; and an intumescent material completely enclosed within the enclosed slot, whereby when the door is closed and the frame is subjected to flames the intumescent material expands causing the movable lid to release along one edge thereof and pivot about the other edge thereof to enter into contact engagement with the door along an edge thereof thereby providing a smoke stop between the door and the frame.

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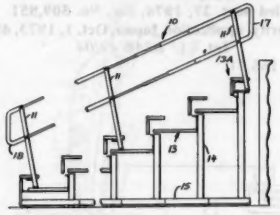
**3,964,215**

## FOLDING HANDRAILS FOR TELESCOPING SEATING SECTIONS

**Arlin P. Hartman, and Richard A. Vance, both of Champaign, Ill., assignors to Universal Bleacher Company, Champaign, Ill.**

**Filed Feb. 18, 1975, Ser. No. 550,478**
**Int. Cl.² F04H *3/12***
**U.S. Cl. 52—9** **6 Claims**

**1.** In a telescoping seating system having a plurality of row sections movable between a closed storage position in which said row sections are in superposed relation and an open use position in which said row sections are in stepped relation and including a folding handrail secured to said row sections and movable therewith between said closed and open positions, said handrail including a plurality of posts and upper and lower telescoping rail means pivotally connected between adjacent posts, the improvement comprising: bracket means secured to a row section for each of said posts and extending laterally thereof, each bracket means holding an associated post inclined at an acute angle relative to the vertical with the upper end of a post extending upwardly and outwardly of an




associated bracket means; and pivot connection means for mounting said upper and lower rail means to the same side of said posts, whereby the axes of said upper and lower rail means lie in the same vertical plane and said rail means do not extend in front of said seating system when said system is in closed position.

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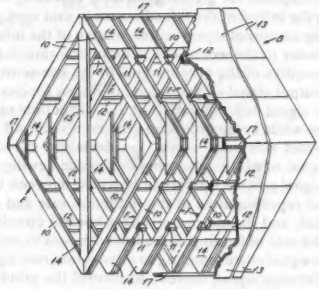
**3,964,216**

## MODULAR BUILDING CONSTRUCTON

**Roger A. Hummel, Suttons Bay, Mich., assignor to G. Tsutomu Arai and Roger A. Hummel, Architects, Suttons Bay, Mich.**

**Filed Oct. 31, 1974, Ser. No. 519,611**
**Int. Cl.² E04B *1/34***
**U.S. Cl. 52—79** **13 Claims**

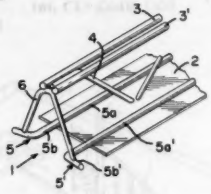



**1.** A modular building construction, comprising a plurality of generally similar basic block units each including at least two parallel, generally similar quadrilateral frames each having straight sides in effect intersecting one another in a common plane thereof, said frames being in a spaced relation to one another lengthwise and perpendicular to the planes of the same and having parallel vertical diagonals between opposed apices, means interconnecting said frames to one another to constitute the block unit, and bracket means adjacent an angular apex of a block unit outline to connect said unit to an adjacent block unit in major part by said bracket means, said basic block units, as thus bracket-connected together, having sides lying generally parallel to one another but being sufficiently spaced transversely from another adjacent block unit and throughout the length thereof to afford an elongated service or like space between said adjacent block units.

## 3,964,217
## LOAD BEARING BEAM FOR FLOORS AND THE LIKE

Salvatore Leone, Residenza al Parco No. 11.3.301, Milan 2 - 20090 Segrate, Italy

Filed Jan. 9, 1975, Ser. No. 539,578
Claims priority, application Italy, Sept. 26, 1974, 27717/74
Int. Cl.² E04B 1/32; E04H 12/10
U.S. Cl. 52—86 8 Claims

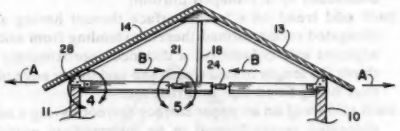



1. A structural load bearing beam for floors and the like comprising
   a base disposed on a longitudinal median axis thereof,
   stiffening means secured at a lower end thereof to said base and projecting upwardly therefrom,
   stringer means secured on an upper end of said stiffening means, and
   a pair of L-shaped and transversely spaced support elements substantially co-planar with respect to said base and each having a first segment secured and confined on an end and outer surface of said base and a second segment projecting in cantilevered relationship beyond the end of said base, the second segments of said support elements extending away from each other and outwardly from said axis.

## 3,964,218
## PREFABRICATED ROOFING STRUCTURE

Jack H. Y. Ho, Haig Road, Singapore, assignor to Unifab Housing, Inc., Los Angeles, Calif.

Filed Jan. 31, 1975, Ser. No. 545,725
Int. Cl.² E04B 7/02, 5/52
U.S. Cl. 52—90 2 Claims

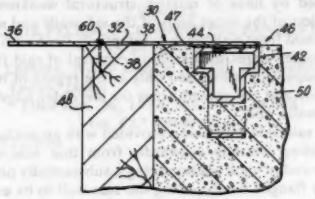



1. A prefabricated roofing structure for a building having opposite bearing walls comprising, in combination:
   a. a center ridge member;
   b. roof sheets secured to and slanting downwardly from said ridge member to overlie the upper edges of said opposite bearing walls;
   c. a plurality of inverted T-bars extending transversely of said ridge member between the upper edges of said bearing walls in horizontal spaced parallel relationship;
   d. vertical hangers extending from said ridge member to the centers of the T-bars to support the T-bars;
   e. bracket means securing the ends of the T-bars, the upper edges of the bearing walls and the lower end portions of the roof sheets together;
   f. turnbuckle means in each of the T-bars so that a contracting force pulling the ends of the bars towards each other can be applied; and,
   g. ceiling panels extending between the T-bars and supported by the inverted cross portions of the T-bars.

## 3,964,219
## INSERT AND ANCHOR POSITIONING AND LOCATING DEVICE

Alfred A. Hala, Islip, N.Y., assignor to Hohmann & Barnard, Inc., Hauppauge, N.Y.

Filed May 5, 1975, Ser. No. 574,395
Int. Cl.² E04B 1/38
U.S. Cl. 52—105 66 Claims

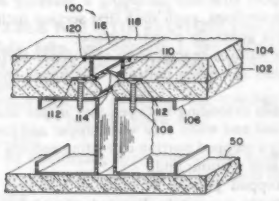



1. An insert positioning and locating device for initially positioning said device with respect to a concrete form in order to locatingly secure said insert in a predetermined orientation with respect to a thereafter poured concrete structure, said device comprising
   a tab member, and
   an insert member,
   means for detachably securing said insert member to said tab member in predetermined relationship,
   said device including means for lateral and longitudinal positioning thereof with respect to said concrete form,
   said tab member having means for permitting removable positional securement thereof to said concrete form, and
   said removal of said tab member from said concrete form and detachment thereof from said insert permitting of predetermined locational securement of said insert with respect to said resultant concrete structure.

## 3,964,220
## CONTROL JOINT WITH TEAR STRIP

Edward J. Rutkowski, Kenmore, and Gerard T. Sowinski, Lancaster, both of N.Y., assignors to National Gypsum Company, Buffalo, N.Y.

Division of Ser. No. 28,906, April 15, 1970, abandoned, which is a continuation-in-part of Ser. No. 701,164, Jan. 29, 1968, abandoned. This application Mar. 7, 1972, Ser. No. 232,598
Int. Cl.² E04B 1/41
U.S. Cl. 52—100 1 Claim




1. In a wall structure including a support and a pair of separate slabs of plaster-like material cast in situ on said support, the combination therewith of a unitary elongated expansible hollow separator between said slabs:
   a. said separator having a front wall, a rear wall and opposite side walls;
   b. said rear wall including a pair of planar flanges for attaching said separator to said support with said front wall facing outwardly, said flanges respectively extending laterally in opposite directions, said side walls serving as screeds to establish the thickness of said slabs;

c. the center portion of said rear wall being inwardly arched to allow movement of said side walls toward and away from each other in response to expansion and contraction of said separate slabs;

d. said front wall being joined to the side walls by fracture webs of weaker cross-sectional strength than said front wall whereby said front wall forms a tear strip removable after said slabs are formed, said fracture webs being defined by lines of relative structural weakness at the junction of the outer ends of the sidewalls and said front wall, said front wall being substantially flush with said side wall outer edges so that upon removal of said front wall said separator is exposed only at the region of its hollow interior and the screed areas on the outer edges of said side walls; and

e. each said side wall being provided with an anchor means extending laterally outwardly from that side wall, the outer end of each anchor being a substantially perpendicularly flanged head locking the side wall to its associated slab for conjoint movement therewith.

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**3,964,221**

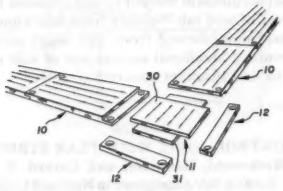
## PLATFORM SECTIONS

**DeWayne Donald Berquist, Anoka, Minn., assignor to Aggressive Industries Inc., St. Paul, Minn.**

**Continuation-in-part of Ser. No. 391,063, Aug. 24, 1973, abandoned. This application Feb. 18, 1975, Ser. No. 550,518**

**Int. Cl.² E04F *11/16*; E04C *1/30***

**U.S. Cl. 52—177** **4 Claims**




1. A support structure including a plurality of individual first support sections, each such first section including:

a. an upper generally planar surface;

b. a lower surface spaced from said upper surface;

c. side walls extending between said upper and lower surfaces;

d. end walls extending between said upper and lower surfaces, said end walls, side walls, upper and lower surfaces defining a stepped portion extending entirely transversely across said section; and,

e. said stepped portion of each of said end walls being respectively oppositely directed whereby next adjacent first sections may overlap upon the stepped portion;

f. each of said support sections being provided with a plurality of longitudinally and transversely aligned axial columns formed between said upper and lower surfaces connecting the same and defining an axial passage therethrough;

g. longitudinally extending grooves being formed in one of said surfaces and connecting the aligned axial passages on said surface; and,

h. transversely extending grooves being formed in the other of said surfaces and connecting the aligned passages on said surface.

**3,964,222**

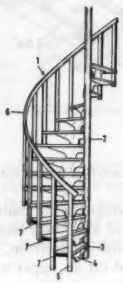
## WOODEN SPIRAL STAIRCASE

**Johannes Geleijnse, and Machiel Geleijnse, both of Vlaardingen, Netherlands, assignors to Firma M. Geleijnse & Zoon, Vlaardingen, Netherlands**

**Filed Jan. 27, 1975, Ser. No. 544,283**

**Int. Cl.² E04F *11/00***

**U.S. Cl. 52—187** **6 Claims**



1. A wooden spiral staircase comprising

a central column having a vertical axis;

a plurality of vertically spaced treads, each tread having longitudinally spaced ends and extending transversely with respect to said column, one said end spaced remotely from said column, and the other said end spaced closely adjacent to said column;

a plurality of risers, one each located to extend vertically between said spaced adjacent treads, each said riser including an upper edge and a lower edge with said edges connected by a T-shaped portion;

each said tread on a lower surface thereof having a first elongated recess formed therein extending from said end adjacent said column for a distance approximately two-thirds the length of said tread, and said upper edge of said riser being fitted into said first recess;

each said tread on an upper surface thereof having a second elongated recess formed in an intermediate portion of said tread located in the tread portion closest to said column, and said lower edge of said riser being fitted into said second recess;

adjacent treads having equal spacing therebetween measured vertically along the column surface parallel to said axis of said column;

each said vertical spacing along said column surface having an elongated vertical opening formed therein, each said opening having a vertical measurement approximately half of said vertical spacing;

said plurality of openings corresponding in number to said treads and respectively positioned in alignment with each said riser;

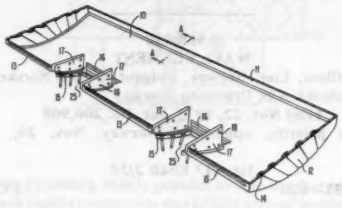
each said riser at the upper part of its T-shaped portion including a tenon fitted into one of said openings, each said tenon extending past said axis of said column to terminate at a distance approximately half-way between said axis and the surface of said column; and

means connecting vertically adjacent treads at the ends remote from said column.

## 3,964,223
## WATERPROOF SHEET FOR AIRCRAFT CARGO CHAMBER

**Takashi Sato, Chigasaki; Katuyuki Saita, Yokohama; Tadashi Naito, Hatano, and Harumi Takeda, Yokohama, all of Japan, assignors to The Yokohama Rubber Co. Ltd., Tokyo, Japan**

**Filed June 13, 1975, Ser. No. 586,777**
**Int. Cl.² E04B 5/00**
**U.S. Cl. 52—273** **7 Claims**

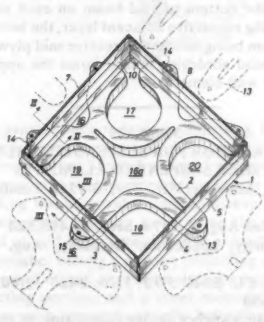


1. A waterproof sheet for cargo chambers of aircraft comprising a base sheet adapted to lie on the floor of said chamber and having notched portions at positions corresponding to the doors of said chamber; door sill flaps provided to said base sheet around said notched portions and adapted to be folded up and down at the time of opening and closing of said door; door sill protectors provided to said base sheet at said notched portions for protecting said door sill flaps; side sheets provided at the longitudinal sides of said base sheet and having tape fasteners for securing said base sheet to the wall of said chamber; and end sheets provided at the longitudinal ends of said base sheet and said side sheets and having tape fasteners for tucking the end sheets when said base sheet and side sheets are positioned properly in said chamber.

## 3,964,224
## PLATE-SHAPED MODULE UNITS

**Sofus Georg Christensen, 103 Hovedvejen, 2600 Glostrup, Denmark**

**Filed Sept. 9, 1974, Ser. No. 504,246**
**Int. Cl.² E04F 13/08; E04C 1/30**
**U.S. Cl. 52—387** **5 Claims**

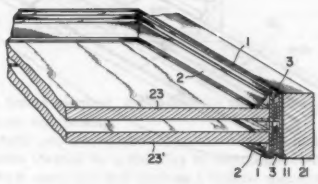


1. A square or rectangular module unit for covering walls, ceilings, and similar surfaces with slabs, the back of said module unit being provided with a fastening member, which has lateral projections to align identical module units, said projections extending beyond two adjacent edges of the module unit and at the two other edges being provided with similar indentations for receiving projections of the fastening member of the adjacent module unit, said indentations facing the center of the module unit, wherein the fastening member is connected to a square or rectangular frame, of which the sides form protective means all along the periphery of the module unit, two adjacent sides having longitudinal tongues projecting therefrom and the other two adjacent sides having longitudinal grooves for connecting the module unit to adjacent module units.

## 3,964,225
## DEVICE FOR FIXEDLY CONNECTING PANELS FOR USE IN BUILDING

**Tsukasa Yoshida, Nikko Danchi 15-202 Nikko-cho No. 1-3, Fuchu, Tokyo, Japan**

**Filed Dec. 26, 1973, Ser. No. 428,044**
**Int. Cl.² E06B 3/24**
**U.S. Cl. 52—500** **1 Claim**



1. A dual panel mounting frame comprising at least one edge frame member having a first pair of parallel spaced apart plates, connecting means extending transversely between said first pair of plates intermediate the edges thereof to define two opposed edge opening recesses between said plates, a second pair of parallel spaced apart plates integral with and extending perpendicular to one of said first pair of plates adjacent said connecting means, a pair of substantially V-shaped pressing frame members, each pressing frame member having a first plate adjustably extending into one of said recesses in engagement with one of said first pair of plates and a second plate extending towards said second pair of plates to grip a pair of panels between said second pair of plates and said pressing members and expandable plug means disposed in said recesses to force said first plate of each of said pressing frame members into tight engagement with said one of said first pair of plates; said expandable plug means being provided with an aperture and further comprising wedge means adapted to be driven into said aperture to expand said plug means.

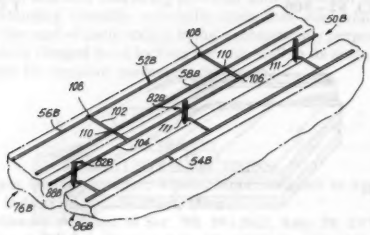
## 3,964,226
## ADJUSTABLE WALL-TIE REINFORCING SYSTEM

**Alfred A. Hala, Islip, and Bernard J. Schwalberg, Brooklyn, both of N.Y., assignors to Hohmann & Barnard, Inc., Hauppauge, N.Y.**

**Filed Sept. 27, 1974, Ser. No. 510,054**
**Int. Cl.² E04B 2/30**
**U.S. Cl. 52—562** **20 Claims**

1. A wall-tie reinforcing apparatus for use in the construction of wall structures having spaced inner and outer wythes and comprising
a wall-tie reinforcing assembly, and
a wall-tie reinforcing element,
means securing said wall-tie reinforcing assembly with respect to one of said inner and outer wythes,
means securing said wall-tie reinforcing element with respect to the other of said inner and outer wythes,
said wall-tie reinforcing assembly having a substantially planar construction and comprising
a pair of spaced parallel reinforcing members positionally secured within said one of said wythes, and
a plurality of U-shaped members extending laterally of said pair of parallel reinforcing members,

each of said U-shaped members having a pair of arms and a base,
each of said arms being secured to each of said reinforcing members,
the base of each of said laterally extending U-shaped members comprising the outer ends thereof and being disposed in the space between said wythes,
said wall-tie reinforcing element comprising
at least one longitudinal reinforcing rod positionally secured within said other of said wythes, and
a plurality of rods extending laterally from said longitudinal reinforcing rod,
means securing the inner end of each of said lateral rods to said longitudinal reinforcing rod,




the outer end of each of said lateral rods being disposed in the space between said wythes,
said base of each of said laterally extending U-shaped members comprising locking means,
said outer end of each of said lateral rods having engaging means thereat,
said engaging means being vertically adjustable with respect to said base locking means and disposed in locking engagement therewith, and
said locking engagement of the outer ends of respective ones of said laterally extending members with respective ones of the outer ends of said lateral rods providing laterally immovable locking engagement of said wall-tie reinforcing element with respect to said wall-tie reinforcing assembly.

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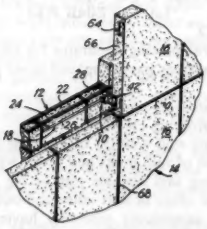
**3,964,227**
**ANCHORING APPARATUS FOR FIXEDLY SPACING MULTIPLE WALL CONSTRUCTIONS**
**Alfred A. Hala, Islip, N.Y., assignor to Hohmann & Barnard, Inc., Hauppauge, N.Y.**
**Filed Sept. 27, 1974, Ser. No. 510,053**
**Int. Cl.² E04B 2/30**
**U.S. Cl. 52—568** **94 Claims**




1. An anchoring apparatus for use in the construction of wall structures having an inner wythe and an outer wythe in spaced apart relationship and comprising
a longitudinal member,
a multiplicity of lateral members each having one of the ends thereof secured to one of said inner and outer wythes and each having the other end thereof fixedly secured to said longitudinal member fixedly securing said longitudinal member in the space between said wythes,
a wall-tie element having connecting means on the outer end thereof providing fixed adjustable securement of said wall-tie element to said longitudinal member, and
said wall-tie element having connecting means on the inner end thereof providing securement of said inner end to the other of said inner and outer wythes.

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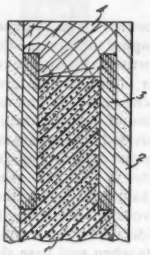
**3,964,228**
**WALL ELEMENT**
**Walter Nilsen, Lier, Norway, assignor to Den Norske Gipsplatefabrikk A/S, Drammen, Norway**
**Filed Nov. 22, 1971, Ser. No. 200,908**
**Claims priority, application Norway, Nov. 24, 1970, 4513/70**
**Int. Cl.² E04B 2/28**
**U.S. Cl. 52—620** **4 Claims**




1. A wall element having an upper edge and comprising first and second parallel spaced apart stiff outer layers extending to said upper edge, a U-shaped wall element load absorbing means extending between said layers at said upper edge and being affixed thereto, said layers and load absorbing means defining a cavity, and a porous material filling said cavity, said load absorbing means comprising a wooden beam having sides affixed to said layers and a top edge extending to the upper edge of said wall element, and a separate plywood strip extending from the bottom of said beam on each side thereof and affixed to the respective adjacent layer, the bottoms of the side of said beam being notched to receive said plywood strips, whereby said load absorbing means forms the upper contact surface of said wall element.

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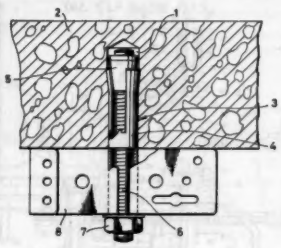
**3,964,229**
**EXPANSION ANCHOR FOR SUSPENDED CEILINGS AND OTHER SUSPENDED ELEMENTS**
**Artur Fischer, Altheimer Str. 219, D-7241 Tumlingen, Germany**
**Filed Aug. 7, 1974, Ser. No. 495,523**
**Claims priority, application Germany, Aug. 30, 1973, 2343713**
**Int. Cl.² E04C 5/12, 5/16; B42F 13/00**
**U.S. Cl. 52—698** **6 Claims**

1. An expansion anchor device comprising, in combination, an expansion sleeve having a leading end and a trailing end; an expander member located at said leading end; a threaded member having an axis and coaxially extending through said expansion sleeve and connected with said expander member for drawing the latter into said leading end to expand said expansion sleeve, said threaded member having a portion projecting outwardly from said trailing end; and a sheet-material bracket having a circumferentially incomplete arcu-

ate first portion bounding an axial slot and a passage for coaxially freely receiving said projecting portion of said threaded member, two second portions each located in a general plane which is substantially parallel to said axis, and two transition



portions extending axially parallel to one another at said slot and each rigidly connecting one of said second portions to said first portion of said bracket, said second portions being formed with apertures for connecting thereto a component to be attached to a support in which the device is anchored.

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**3,964,230**

## EXPANSION ANCHOR DEVICE

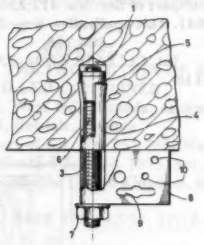
**Artur Fischer, Altheimer Strasse 219, D-7241 Tumlingen, Germany**

**Filed July 29, 1974, Ser. No. 492,733**

**Claims priority, application Germany, July 30, 1973, 7327898[U]**

**Int. Cl.² E04C** *5/12, 5/16;* **B42F** *13/00*

**U.S. Cl. 52—698** **4 Claims**



1. An expansion anchor device comprising, in combination, an expansion sleeve having a leading end and a trailing end; an expander member located at said leading end of said expansion sleeve; a threaded member having an axis and coaxially extending through said expansion sleeve and connected with said expander member for drawing the latter into said leading end of said expansion sleeve to expand the same, said threaded member having a portion projecting outwardly from said trailing end of said expansion sleeve; a nut threaded onto said projecting portion; and a sheet metal bracket having a bent first portion circumferentially bounding a passage for coaxially receiving said projecting portion of said threaded member intermediate said nut and said trailing end of said expansion sleeve, and at least one second portion rigidly connected to said first portion and located in a general plane which is substantially parallel to said axis, said second portion being formed with apertures for connecting thereto a component to be attached to a support in which said device is anchored.

**3,964,231**

## PLASTIC-ENCASED METALLIC HOLLOW PROFILE MEMBER

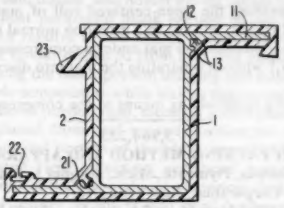
**Wolfgang Budich; Robert Krah, both of Sieglar, and Hans Theissen, Eschmar, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Germany**

**Filed Nov. 29, 1973, Ser. No. 420,053**

**Claims priority, application Germany, Nov. 29, 1972, 2258420**

**Int. Cl.² E04C** *3/30*

**U.S. Cl. 52—727** **26 Claims**



1. A frame element, especially for door and window constructions, comprising:

a metallic profile member of hollow cross-sectional configuration formed by a plurality of interconnected side walls which surround and enclose a hollow space, said profile member including an outer flange formed as an extension of a first of said side walls such that a corner is formed on the outside of said profile member at the junction of said outer flange and a second of said side walls,

a plastic sheath extrueded onto enclosing said profile member, and,

attaching means for fixedly attaching said sheath to said profile member at said corner, said attaching means are constructed such that the sheath, as seen in cross section of the element, contacts the exterior surface of said profile member flush at all points thereof.

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**3,964,232**

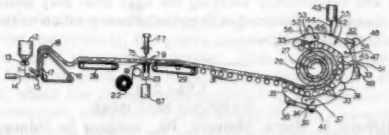
## METHOD OF PACKAGING FIBROUS MAT STRUCTURE

**David John Bender, Toledo, and Frank Steve Kubovich, Rossford, both of Ohio, assignors to Johns-Manville Corporation, Denver, Colo.**

**Continuation of Ser. No. 403,682, Oct. 4, 1973, abandoned, which is a continuation of Ser. No. 203,410, Nov. 30, 1971, abandoned. This application May 19, 1975, Ser. No. 578,589**

**Int. Cl.² B65B** *63/04, 63/02*

**U.S. Cl. 53—21 FW** **1 Claim**



1. In a method for packaging a continuous length of bonded glass fiber insulating mat product having a facing of sheet material bonded to one major surface of the mat wherein the mat is advanced toward a winding operation having a winding axis normal to the direction of advance, the mat is perforated normal to a major face of the mat and in a line transverse of its direction of advance whereby subsequent separation of the mat into discrete lengths at the point of use is facilitated, and the mat is turned solely upon itself in the winding operation to form a multi-layered roll, the improvement comprising:

a. guiding and turning the mat solely upon itself to form a roll with an open center core which is defined by the mat

and permits the roll to assume an elliptical shape after it has been formed,

b. driving the mat being wound on the roll and forming a peripheral layer of the roll at a speed substantially the same as the speed at which mat is fed into the winding operation to loosely wind the mat on the roll,

c. confining the roll being formed to a volume which increases in diameter at a rate substantially equal to the rate that the diameter of the roll being formed increases to loosely wind the mat on the roll, producing a compression of the mat of less than 2:1,

d. compressing the open-centered roll of mat formed in steps (a), (b), and (c) in a direction normal to its wound axis, to compress the mat under a compression ratio of at least 6:1 without separating the mat into discrete lengths, and

e. applying constraining means to the compressed roll.

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**3,964,233**

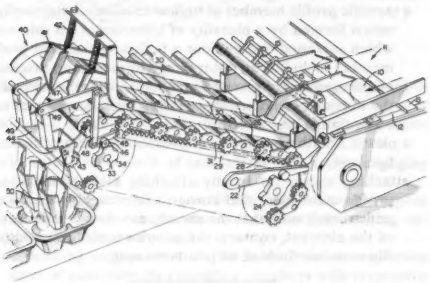
## EGG PACKING METHOD AND APPARATUS

**Leslie P. Thomas, Plymouth, Mich., assignor to Diamond International Corporation, New York, N.Y.**

**Filed May 15, 1974, Ser. No. 470,314**

**Int. Cl.² B65B** *21/06, 35/54*

**U.S. Cl. 53—26** **39 Claims**



1. A method of packing articles such as eggs in the pockets of a carton or tray comprising the steps of

separating the eggs into rows,

feeding the eggs in each row one at a time to an inclined conveyor,

moving the eggs in the direction of their pointed ends while also moving them up the inclined conveyor,

turning the eggs to a point down position near the top of the inclined conveyor, by contacting each egg and turning it toward the point down position on the inclined conveyor upper end,

and supportingly carrying the eggs after they assume and while maintained in the point down position to the pockets therebelow.

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**3,964,234**

## CAPPING MACHINE

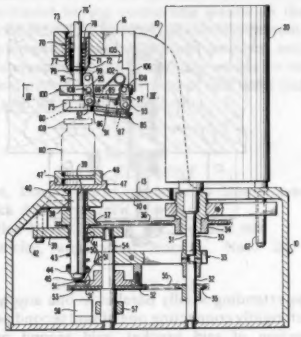
**Richard F. Hurst, Malvern, Pa., assignor to Sidney Rosen, Baltimore, Md.**

**Filed Jan. 7, 1975, Ser. No. 539,044**

**Int. Cl.² B67B** *3/18*; **B65B** *7/28, 57/00*

**U.S. Cl. 53—77** **38 Claims**

1. A capping machine for crimping the caps of containers, which is operable to carry out automatically one complete cycle of operation, once initiated by an operator, comprising housing means, container-receiving platform means, drive means including first means for rotating said platform means and second means for controllably raising and lowering said platform means in timed relation to the operating cycle, and a crimping mechanism above the platform means and operable to engage the cap of a container on the platform means when being raised and rotated by said drive means, including crimping roller means and mechanical means for positively controlling the movement of said crimping roller means



toward and away from the edge of the cap in dependence on the raising and lowering movements of the container and cap on the platform means.

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**3,964,235**

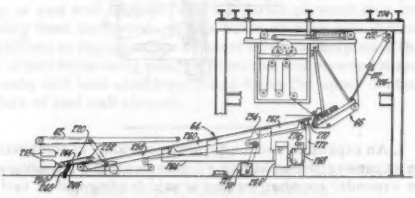
## ROLL-UP COMPRESSIVE PACKAGING APPARATUS

**Ward B. Miller, Waterville, and Daniel A. McCartan, Heath, both of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

**Continuation-in-part of Ser. No. 412,236, Nov. 2, 1973, Pat. No. 3,911,641. This application Aug. 26, 1974, Ser. No. 500,795**

**Int. Cl.² B65B** *63/04, 27/12*

**U.S. Cl. 53—118** **16 Claims**

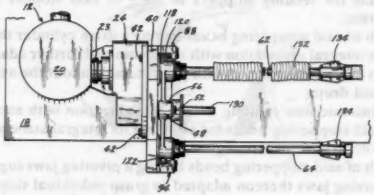


1. Apparatus for rolling and compressing a flexible, compressible strip, said apparatus comprising an endless belt, a portion of said belt defining a loop, means for feeding an end of the strip into the loop, means for moving said belt, means for placing said belt under tension to place the strip in compression as it is rolled in the loop, means for discharging the rolled strip from said loop by opening said loop after the strip is rolled up, tape-dispensing means for feeding tape toward said loop, a pivotable suction conveyor between said tape-dispensing means and said loop, said tape-dispensing means comprising two groups of tape dispensers on two different levels, and said pivotable suction conveyor being pivotably movable between the groups of dispensers.

## 3,964,236
## STUFFING TUBE APPARATUS FOR AN ENCASING MACHINE

David W. Smith, West Des Moines, Iowa, assignor to Townsend Engineering Company, Des Moines, Iowa

Filed Apr. 7, 1975, Ser. No. 566,035
Int. Cl.² B65B 3/10
U.S. Cl. 53—122 11 Claims



8. In combination,

an encasing machine comprising, a metering product pump in communication with a source of plastic meat product and having an outlet conduit extending thereform to continuously pump a plastic meat product therethrough,

a support means on said encasing machine,

a stuffing tube assembly mounted on said support means comprising a support member selectively movably mounted on said support means and having at least a pair of elongated stuffing tubes mounted thereon in a spaced apart relationship, each of said stuffing tubes having inlet and discharge ends,

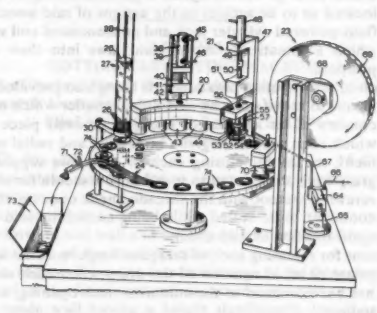
and means for selectively moving said support member so that the inlet end of one of said stuffing tubes is placed in operative communication with said outlet conduit and so that the other stuffing tube is moved to a loading position to enable a folded casing to be mounted thereon,

and means for rotating said one stuffing tube about its longitudinal axis when said one stuffing tube is in operative communication with said outlet conduit.

## 3,964,237
## APPARATUS FOR THE PRODUCTION OF A PRODUCT FILLED CONTAINER

Poul Egon Johansen, West Hill, Canada, assignor to Portion Packaging Limited, Rexdale, Canada

Continuation-in-part of Ser. No. 357,785, May 7, 1973, abandoned. This application Jan. 24, 1975, Ser. No. 543,977
Claims priority, application United Kingdom, May 10, 1972, 21976/72
Int. Cl.² B65B 3/02, 47/02, 47/10
U.S. Cl. 53—141 15 Claims

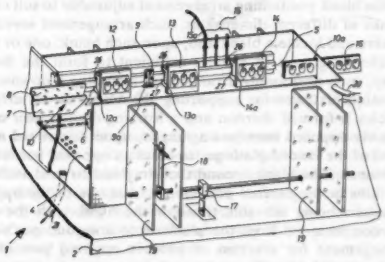


1. Apparatus for producing an individual rimmed plastic container preparatory to the filling and closing thereof from a relatively stiff resilient blank of predetermined shape formed entirely of heat formable material which is essentially rigid at normal ambient temperatures comprising means for supporting a supply of blanks, a rigid blank holder mounted for translating movement and means for translating same, said holder having an opening therethrough corresponding to the shape of but slightly smaller than said blank and presenting a support ledge therearound, means for delivering a blank from a supply supported on said support means and seating the outermost peripheral portion of said blank on said support ledge at a first position of said holder, said holder having means for engaging said outermost peripheral blank portion to preclude movement thereof relative to said holder, means at a second position of said holder displaced from said first position for uniformly heating the blank portion bridging said holder opening to a formable temperature while leaving said seated outermost peripheral blank portion rigid, means at a third position of said holder displaced from said second position for clamping a heated peripheral portion of the blank immediately adjacent to said seated rigid outermost peripheral portion against movement out of the plane of said outermost rigid peripheral portion and further means at said third holder position for forming a cavity from the heated blank portion within said clamped peripheral portion while same remains clamped.

## 3,964,238
## DEVICE FOR MANUFACTURING, FILLING AND SEALING CONTAINERS

Walter Bippus; Hermann Gernlein, both of Ettlingen, and Manfred Horst Simon, Ettlingen-Spessart, Germany, assignors to Industriewerke Karlsruhe-Augsburg Aktiengesellschaft, Germany

Filed Nov. 8, 1974, Ser. No. 522,316
Claims priority, application Germany, Nov. 9, 1973, 2356055
Int. Cl.² B65B 3/02, 31/00
U.S. Cl. 53—167 11 Claims



1. In a device for manufacturing, filling and sealing containers serving, particularly, to receive aseptic pharmaceuticals having a liquid to pasty consistency, from two constantly parallel facing supplied webs, of deformable and sealable foil material, which has already been subjected to a preliminary aseptic treatment, in a plurality of preferably linearly arranged container-working stations and a container-filling station, the improvement comprising, in combination, respective pairs of mutually displaceable, mirror-reversed mating tool parts at each container-working station respectively operable on both webs of the foil material, in sequence, to form therefrom a predetermined number of containers simultaneously in advance of said filling station, to simultaneously seal the side and bottom edges of said predetermined number of containers in advance of said filling station, and to simultaneously sealingly close said predetermined number of containers after simultaneous filling thereof at said filling station; means maintaining germ-free conditions in said device; said tool parts cooperating with said means before and during the manufacturing process; and a pair of elongated guide members extending in

laterally spaced parallel relation to each other longitudinally of the direction of linear arrangement of said stations; said pairs of tool parts being mounted on said guide members for adjustment therealong; said filling station including a number of container-filling needles, equal to said predetermined number of containers, mounted on said device; both said webs being stepped longitudinally of all said stations for forming, filling and sealing said containers; the step distance between said stations being simultaneously a function of two parameters, one of which is the desired width of an individual container and the other of which is the number of containers to be formed simultaneously.

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**3,964,239**

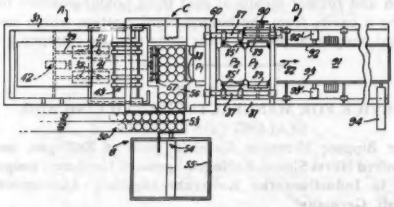
## PACKAGING MACHINE

**Peter Ellice Elford, 3 Wincroft Road, Caversham, Reading, Berkshire, England**

**Filed Jan. 23, 1975, Ser. No. 543,529**

**Int. Cl.[2] B65B** *5/02, 5/06*

**U.S. Cl. 53—196** **13 Claims**



**1.** A packaging machine for forming packages, each comprising an array of articles in a carton, from supplies of the articles and of carton blanks, the machine comprising a first carton blank positioning arrangement adjustable to suit carton blanks of different dimensions, such arrangement serving to receive and locate a blank and, upon such blank, one or more articles or groups of articles sufficient to form the desired array, such positioning arrangement including a downwardly movable platform for supporting the blank as the array of articles is formed thereon and a forming-die-less pair of adjustable opposed members arranged, upon downward movement of the loaded platform, to erect an opposed pair of wall portions of the blank around the array and to hold such wall portions in the erected position, at least one of the opposed members being movable to allow the blank with the array thereon to move from the platform to a second positioning arrangement for erection of another opposed pair of wall portions of the blank.

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**3,964,240**

## BOTTLE CLOSING APPARATUS

**Ernest L. Evrard, Charenton, France, assignor to Societe Anonyme Machines Automatiques Cilliotta, Morangis, France**

**Filed Jan. 13, 1975, Ser. No. 540,493**

**Claims priority, application France, Feb. 27, 1972, 72.06616**

**Int. Cl.[2] B65B** *7/28;* **B67B** *1/06*

**U.S. Cl. 53—306** **15 Claims**

**1.** Apparatus for stoppering and providing sealing closures for containers and the like which have threaded neck openings and which are adapted to receive for their stoppering corresponding pre-threaded stopper closure elements each of which make screwed engagement with the neck opening to effect the sealing of the container, which apparatus comprises in cooperative combination:

mechanical conveyor means for feeding into the apparatus the containers to be stoppered;

a generally vertically disposed rotatable drum adapted to be turned when driven and further adapted to hold and carry containers with it when said containers are fed into the apparatus to the drum;

means associated in engagement with said drum for driving same;

a frame fixed with the drum having at least one stoppering head element regularly distributed on its periphery;

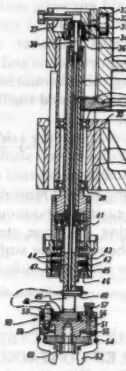
each of said stoppering heads being in association with a corresponding stopper feed arm that is adapted to receive individual stoppers fed to it;

means for feeding stoppers to each of said stopper feed arms;

each of said stoppering heads having a drive cylinder that is in integral association with said drum and further adapted to move both parallel with and rotatable about the axle of said drum;

an intermediate limiting means in connection with each of said stoppering heads for effecting its integral association with said drum driving means;

each of said stoppering heads having a pivoting jaws support having jaws thereon adapted to grasp individual stoppers fed thereto from said stopper feed arms;



each of said pivoting jaws supports being provided thereon with a non-flexible concentric ring and at least one associated fluid powdered cylinder jack, said ring being so located as to be subject to the actions of said associated fluid-powered cylinder jack and an associated coil spring which automatically moves said jaws into their open position;

each of said pivoting jaws supports being also provided with means to move same by said drive cylinder which means consists of an associated, engaged grooved piece with which each support is given both axial and radial movement; means for closing each of said jaws supports to grasp each stopper fed to it and hold it secure for sealing screwing thereof with the threaded neck opening of each container to be sealed while being carried by said drum upon rotation of said drum;

means for releasing each of said jaws supports at the appropriate point of rotation of the drum when each stopper has been screwed to the container neck opening, whereupon

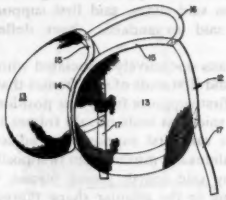
said drum then discharges each of said stoppered and sealed containers to mechanical conveyor discharge means for removing same from the apparatus.

3,964,241

## EYE PROTECTIVE DEVICE

Elaine Allen, and Eileen Schrier, both of 9223 Overland Road, Boise, Idaho 83705

Filed July 29, 1974, Ser. No. 492,746
Int. Cl.² B68C 5/00
U.S. Cl. 54—80 3 Claims



1. A device for the protection of the eyes of a large animal such as a horse or cattle without material restraint or obstruction of vision comprising a flexible frame having a central relatively narrow portion adapted to overlie the head of the animal and extend along the surface of the front of the head between the eyes substantially midway normal to a line connecting the eyes and loops extending laterally outwardly from said central portion each adapted to engage the head of the animal above, below and laterally outwardly of the eyes, said loops being continuous and said central portion serving as a common side of each loop, upper and lower straps connecting the loops, the upper strap being adapted to pass over the animal's head behind the ears or poll and the lower strap being adapted to pass around the underside of the head below the level of the eyes, at least one of said straps being of the adjustable multipart type, and means providing a vision permitting panel of mesh material on each loop, said panels each being fixed at their perimeters to its loop and each of said panels being of considerably larger area than the space enclosed by its loop and each panel being formed of a material that is flexible but sufficiently stiff to provide an outwardly bulged retained shape whereby when the device is installed on an animal the frame will be drawn into snug conformance with the animal's head by said straps so that insects and the like cannot penetrate to the head regions at and around the eyes while the panels bulge in substantially self supporting fashion outwardly from the loops so as not to interfere with normal eye movements, each side of said frame surrounding an eye of the animal comprising a single length of fabric formed into said loop with one end extending beyond the loop to provide part of said adjustable strap, and adjacent sides of said loops being secured together to provide said central portion, with said loops and central portion forming individual insect-sealed regions around the respective eyes.

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3,964,242

## COTTON HARVESTING MACHINE

G. W. (Charles) Stone, Dyess, Ark., assignor to Agriculture Research Incorporated, Williamsburg, Va.

Filed May 28, 1975, Ser. No. 581,696
Int. Cl.² A01D 46/10
U.S. Cl. 56—30 15 Claims

1. An intake manifold for an apparatus for gleaning cotton comprising:

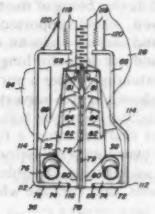
a floor member,

a frontward end wall and a rearward end wall fixed to opposite ends of the floor member,

an outside wall fixed to an outside edge of the floor member and to the frontward and rearward end walls,

an inside wall having a height significantly less than the outside wall, the inside wall fixed to the floor member parallel to, but some distance from, a running edge of the floor member,

a downfall sheet fixed to a top edge of the outside wall, the frontward and rearward end walls, and the inside wall so as to be spaced from and inclined with respect to the floor member,



the inside wall further comprising a plurality of apertures, each aperture opening into a forwardly- and upwardly-inclined duct.

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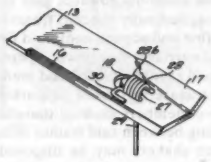
3,964,243

## ROTARY MOWER BLADE WITH DETACHABLE TINES

Earl Albert Knipe, Warsaw, Ill., assignor to Rexnord Inc., Milwaukee, Wis.

Filed Mar. 10, 1975, Ser. No. 556,576
Int. Cl.² A01D 43/02
U.S. Cl. 56—17.5 10 Claims



1. The combination for use with a powered rotary lawn mower comprising:

1. a horizontal flat bar having sharpened end sections and central means for its mounting on the lower end of the vertical drive shaft of the mower, each said end section having a U-shaped cut-out area defining a radially inward-extending tab surrounded by the bar, at least a substantial portion of said tabs lying in the planes of the adjacent portions of said bar, and

2. two tine devices, each device being formed of spring wire and consisting of a series of coils, a tang extending laterally from the first coil and a tine extending downwardly from the last coil, said coils of each device being removably mounted on one of said tabs with the tine projecting downwardly therefrom, each said tine being disposed to be pivotally displaced upwardly and rearwardly respecting rotation of the blade, each said tang engaging the bar and preventing rotation of the device on the tab in one direction, whereby the several coils function as a spring to return the tine to its downward position following such displacement.

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3,964,244

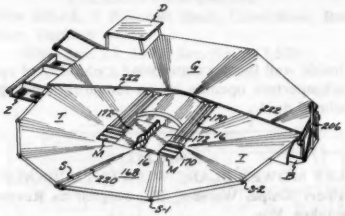
## TREE SHAKER AND FRUIT AND NUT HARVESTER

Rolando M. Vallicella, Rte. 2, Box 562, Bakersfield, Calif. 93307

Filed Dec. 30, 1974, Ser. No. 537,251
Int. Cl.² A01D 46/24
U.S. Cl. 56—329 7 Claims

1. A device that may be moved longitudinally along a space between trees that have the trunks thereof arranged in rows to

sequentially subject each of said trees including those with low hanging branches on one side of said space to a shaking operation to displace fruit or nuts therefrom, to harvest said fruit or nuts, and to deliver said fruit or nuts to a container that travels with said device, said device being of the type that includes an elongate, power driven, wheel supported, manually guidable chassis having first and second ends; an elongate dimensionally stable first fruit and nut deflector longitudinally supported on said chassis and extending under a portion of the branches of a tree when said chassis is in a harvesting position relative thereto; a first longitudinal conveyor belt assembly supported on said chassis under said deflector; a transversely movable carriage disposed between said deflector and said first conveyor belt assembly, said carriage capable of occupying either first or second positions, said carriage when in said first position extending across said first conveyor belt assembly and said carriage when in said second position extending from said first conveyor belt assembly towards said tree that is to be harvested; two longitudinally spaced, transverse elonge rigid members having first and second ends, said first ends pivotally connected to said carriage; two power operated tree shakers supported from said second ends of said members; two longitudinally spaced transverse frames supported from said carriage with said two members situated therebetween, with the longitudinal spacing between said frames being such that said members and tree shakers may be disposed to angle away from one another when said shakers are not in a tree trunk engaging position, and said frames having outwardly disposed longitudinally extending first ends, two second conveyor belt assemblies supported in said frames; first power means for moving said carriage between said first and second position; second power means for pivoting said elongate members towards one another to dispose said tree shakers in gripping pressure contact with the trunk of a tree; third power means for driving said first and second conveyor belt assemblies; two expandable sheet deflectors that may be extended under a tree to cooperate with said first deflector to receive nuts and fruit shaken from a tree, said first deflector and sheet deflectors when expanded defining fruit and nut receiving surfaces that slope towards said second conveyor belt assemblies whereby fruit or nuts falling on said surfaces roll by gravity thereon to said second conveyor belt assemblies to be transported to said first conveyor belt assembly towards said first end of said chassis to be delivered to said container, the improvement for so supporting said two expandable sheet deflectors that they can be extended under trees with low hanging branches to receive fruit and nuts therefrom when said shakers are actuated, said improvement comprising:



a. two transverse, longitudinally spaced rails supported from said chassis above said first conveyor belt assembly, said rails having upwardly inclined first portions above said first conveyor belt assembly and downwardly inclined second portions;

b. roller means on said carriage that movably engage said rails and on at least a portion of the journey from said first to said second position are in engagement with both said first and second portions to cause said shakers as they initially move transversely relative to said chassis to move downwardly at a substantial angle to pass under low overhanging branches of a tree and as said journey continues for said shakers to move downwardly but at a less angle as said roller means rest entirely on said second portions;

c. two slides movably supported from said first ends of said frames;

d. fourth power means for concurrently moving said slides towards and away from one another;

e. two elongate first supports of angular shape pivotally mounted on said slides, said first supports having free edges of said expandable sheet deflectors secured thereto;

f. linkage means operatively associated with said first supports and said first ends of said frames that automatically pivot said first supports from first positions substantially parallel to said first ends of said frames to second positions where said first supports are adjacently disposed when said slides are moved from first positions to second positions by said fourth power means, with said first supports due to the angular shape thereof moving said expandable sheet deflectors upwardly relative to branches of a tree when they move about the trunk of said tree; and

g. a plurality of second supports pivotally supported from said first ends of said frames that are connected to said expandable sheet deflectors and swing outwardly and inwardly relative to said first ends of said frames in conformity with the pivoting movement of said first supports, said second supports serving to assist said first supports in maintaining said expandable sheet deflectors in a fruit and nut receiving position.

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**3,964,245**

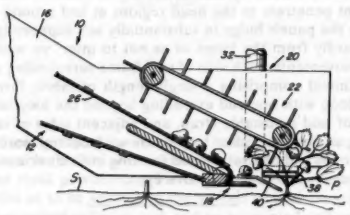
## AIR PICKUP SYSTEM FOR STRAWBERRY PICKERS

**Charles L. Hecht, Scio, Oreg., assignor to S.K.H. & S., Inc., Scio, Oreg.**

**Filed Sept. 17, 1974, Ser. No. 506,898**

**Int. Cl.² A01D *46/00***

**U.S. Cl. 56—331** **10 Claims**

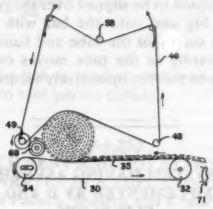


**8.** In combination with a strawberry harvesting machine having a pickup head with severing means thereon at a predetermined level and adjacent the surface of the ground, a lifting arrangement at said predetermined level for the pickup head of the strawberry harvesting machine, comprising two pneumatic ducts arranged for directing a gas under pressure at right angles to a row of strawberries and toward each other and thereby bringing the strawberries into the desired position for cutting of the stems by the severing means, the ducts being arrangeable on the pickup head for upward and downward adjustment.

## 3,964,246
## ROTARY BALER

Arnold F. Kopaska, Guthrie Center, Iowa, assignor to Koehring Company, Milwaukee, Wis.

Filed Dec. 17, 1974, Ser. No. 533,647
Int. Cl.² A01D *39/00*
U.S. Cl. 56—341 25 Claims




**12.** A rotary baler for forming a round bale of windrowed material comprising:

a. a chassis movable along the ground and having spaced apart first and second side walls;

b. a hitch attached to the front of said chassis adapted for attaching the baler to a vehicle;

c. a first roller mounted on said chassis adjacent to the front and bottom thereof for rotation about a substantially horizontal transverse axis;

d. a second roller mounted on said chassis adjacent to the rear and bottom thereof for rotation about a substantially horizontal transverse axis;

e. a first conveyor belt extending transversely substantially between said first and second side walls and drivingly mounted on said first and second rollers forming a first upper run extending between and on the top of said first and second rollers and a first lower run between and below said first and second rollers, said runs being supported only by said rollers;

f. means for driving said first conveyor belt such that said first upper run moves in a direction from the front toward the rear of the baler;

g. roller mounting means for mounting one of said first and second rollers to permit translational movement thereof toward and away from the front of said baler in order to permit downward deflection of said first upper run by the bale being formed in said baler, the extent of deflection being proportioned to the weight of the bale;

h. a third roller mounted on said chassis adjacent to the front thereof and spaced upwardly from said first roller, said third roller being mounted for rotation about a substantially horizontal, transverse axis;

i. a fourth roller mounted on said chassis adjacent to the rear thereof and spaced upwardly from said second roller, said fourth roller being mounted for rotation about a substantially horizontal, transverse axis, the axes of said third and fourth rollers being fixed during formation of the bale;

j. a second conveyor belt extending transversely substantially between said first and second side walls and drivingly mounted on said third and fourth roller forming a second upper run extending between and above said third and fourth rollers and a second lower run between the lower surfaces of said third and fourth rollers, said second lower run being spaced apart from and, prior to formation of said bale, substantially parallel to said first upper run;

k. means for driving said second conveyor belt such that said second lower run moves in a direction from the rear toward the front of the baler;

l. means for extending the length of said second lower run to enable said second lower run to be deflected vertically upwardly;

m. means mounted on said chassis for starting the formation of a round bale;

n. pick-up means at the front of said chassis for picking up the windrowed material from the ground and delivering it to the first upper run.

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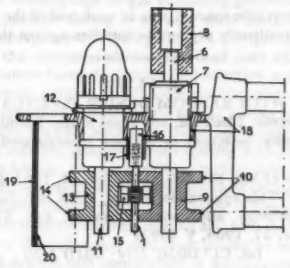
## 3,964,247
## FALSE TWIST SPINDLE

Yves Derail, Ambierle, France, assignor to Chavanoz S.A., Chavanoz, France

Filed Oct. 10, 1974, Ser. No. 513,625
Claims priority, application France, Oct. 25, 1973, 73.38408
Int. Cl.² D02G *1/06*
U.S. Cl. 57—77.45 4 Claims




**1.** A false twist spindle assembly comprising a twist tube having twist locking means for engaging the yarn to be twisted, at least one rotatable drive roller, magnetic means for holding said tube in contact with the surface of said roller for rotation thereby, and sound reducing means comprising an insulating plate partly surrounding said spindle assembly and an insulating cylinder positioned in closely spaced, coaxial surrounding relation about the portion of the twist tube containing said twist locking means.

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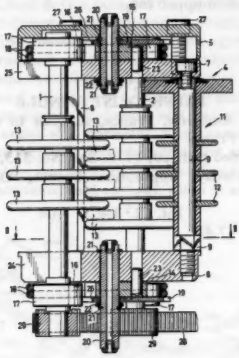
## 3,964,248
## FALSE TWISTING DEVICES

Friedrich Schuster, Hammelburg, Germany, assignor to Kugelfischer Georg Schafer & Co., Schweinfurt, Germany

Filed June 12, 1975, Ser. No. 586,377
Claims priority, application Germany, June 12, 1974, 2428513
Int. Cl.² D02G *1/04*, *1/00*
U.S. Cl. 57—77.4 12 Claims

**1.** An apparatus for false twisting threads by crimping which comprises three spindles each rotatably mounted at both ends in a common frame and each provided with at least one rotationally symmetrical friction element, the spindles lying at the corners, in plan view, of an equilateral triangle, means for

passing a thread which is to be provided with a false twist between the friction elements in a zig-zag path, two mutually



aligned removable spacers, one at each end of the frame, and means for resiliently urging the spindles against the spacers.

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**3,964,249**

**YARN WITH RANDOM DENIER FLUCTUATIONS**

**Helmut Werner, Elsenfeld, and Hans Stapp, Momlingen, both of Germany, assignors to Akzona Incorporated, Asheville, N.C.**

**Division of Ser. No. 630,819, April 14, 1967, Pat. No. 3,478,143. This application Nov. 6, 1969, Ser. No. 369,151**

**Claims priority, application Germany, Apr. 27, 1966, V 30940; Apr. 27, 1966, V 18921**

**Int. Cl.² D02G *3/34*; D01D *5/20***

**U.S. Cl. 57—140 J** **6 Claims**

1. A yarn having random denier fluctuations consisting essentially of polyester filaments having an elongation at breaking point of 30 to 80 percent, a boiling shrinkage capacity of 20 to 50 percent and about 15 to 35 nodules per meter at intervals of about 0.5 to 8 centimeters.

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**3,964,250**

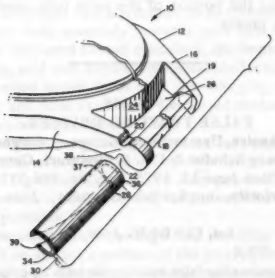
**WRISTWATCH CASE**

**Isaac F. Manchester, Jr., South Dartmouth, Mass., assignor to FAS/CON Systems, Inc., South Dartmouth, Mass.**

**Filed Mar. 24, 1975, Ser. No. 561,268**

**Int. Cl.² G04B *37/00***

**U.S. Cl. 58—88 R** **13 Claims**



1. A wristwatch case and a band for detachably maintaining the watch case including the operating parts of the watch on the wrist of the wearer, said wristwatch case comprising a body portion for the operating parts of the watch and pairs of spaced lugs integral with and extending laterally from the watch case body portion, a bar extending between and integral with the lugs and spaced outwardly from the body portion, one of the lugs having a portion of reduced thickness adjacent the bar, and a watch band having means secured at each end thereof for detachably securing the band upon the bars extended between each pair of lugs, said means comprising a split tube, said tube having a generally diagonally extended slot, the tube adapted to be slipped over the reduced diameter portion of one lug and onto the bar with the lug passing through the slot such that the tube and band are urged outwardly and upwardly as the tube moves onto the bar and between the lugs to thereby operatively secure the band to the watch case.

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**3,964,251**

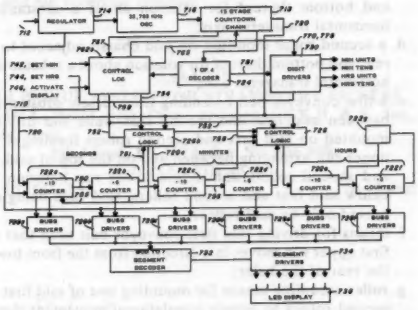
**WATCH SYSTEM HAVING ASYNCHRONOUS COUNTERS IMPLEMENTED BY D AND INVERTED D FLIP-FLOPS**

**Clark R. Williams, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Feb. 19, 1974, Ser. No. 443,894**

**Int. Cl.² G04C *3/00*; G04B *19/30***

**U.S. Cl. 58—23 R** **13 Claims**



1. A pair of serially connected D type flip-flops, each flip-flop having D and clock inputs, and first and second outputs, with the first flip-flop further having a set terminal which sets its first output at a high level upon actuation, the second flip-flop having a reset terminal which sets its first output to a low level upon actuation, said first D flip-flop having its second output coupled into the clock terminal of said second flip-flop, and said set input utilized at a reset input for generating a logic one at said second output of said first flip-flop.

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**3,964,252**

**ADJUSTABLE HINGE BAND**

**Kok-Kit Ho, Kowloon, Hong Kong, assignor to Timex Corporation, Waterbury, Conn.**

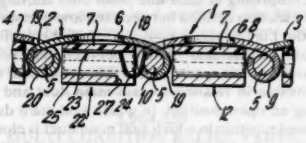
**Filed Sept. 4, 1975, Ser. No. 610,467**

**Int. Cl.³ F16G *13/18***

**U.S. Cl. 59—80** **7 Claims**

1. In a hinge band for a wristwatch or the like, of the type comprising a plurality of links connected by pins, said links having a top plate with opposite sides folded over to provide nesting coaxial collars for holding said pins and also with opposite ends folded to provide a box structure, said hinge band having a plurality of improved removable links, wherein the improvement comprises:

said collars on one side of each of said removable links being only partially closed to permit disengagement of the



pin when the link is pivoted, and spring means biasing said pins into said partial collars.

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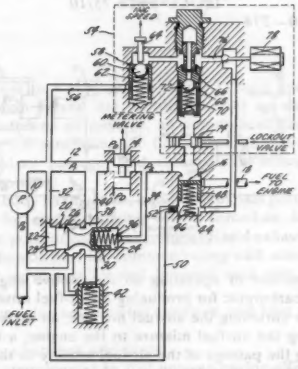
**3,964,253**

## FUEL ENRICHMENT AND HOT START CONTROL APPARATUS IN A FUEL CONTROL

**Stanley Raymond Paduch, Somers, and Kenneth Peter Hansen, Enfield, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed July 3, 1975, Ser. No. 593,087**
**Int. Cl.² F02C 9/08**
**U.S. Cl. 60—39.14** **6 Claims**




1. In a fuel control for a turbine type power plant having a combustion section, a pump for pressurizing fuel, main passage means connecting the discharge end of said pump to said combustion section, a throttle valve located in said passage means for metering fuel flow therein, shutoff valve movable between an open and a closed position in said main passage means downstream from said throttle valve, the improvement which comprises a fuel enrichment and hot start control system comprising:

first passage means in parallel relation with said main passage means communicating the upstream side of said throttle valve with the downstream side thereof for flowing additional fuel therethrough;

valve means in said first passage means responsive to turbine speed for permitting flow of said additional fuel when turbine speed is below idle;

an orifice member downstream of said speed responsive valve means through which the flow of said additional fuel is caused by a pressure drop substantially equal to the pressure drop across said throttle valve;

a manually operated valve in said first passage means for controlling said additional flow; and

means responsive to an engine parameter for shunting said additional flow around said orifice member to said shutoff valve to activate said shutoff valve.

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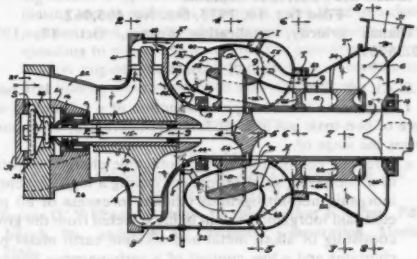
**3,964,254**

## LOW VELOCITY GAS TURBINE WITH EXHAUST GAS RECYCLING

**Ward A. St. John, 3684 San Vicente Court, Newbury Park, Calif. 91320**

**Filed May 12, 1975, Ser. No. 576,591**
**Int. Cl.² F02C 7/08; F02G 3/00**
**U.S. Cl. 60—39.52** **20 Claims**



12. A low velocity high torque producing gas turbine including, a compressor having a working fluid inlet and means delivering compressed working fluid, a compressor-diffuser separating the compressed working fluid into external and internal columns thereof, primary fuel injection means charging the internal column with a combustible mixture, a shaft rotatably supporting a distributing means having radially disposed tubular blading with peripheral and axially disposed discharging nozzles, ignition means igniting said combustible mixture in a burner, energy absorbing turbine blading carried on said shaft and receiving the working fluid through nozzels from the burner, there being an exhaust diffuser receiving working fluid from the turbine blading and with means returning a portion thereof within said shaft driven by said turbine blading and driving said compressor, a mixer comingling the returning portion of exhaust with the said external column, and secondary fuel injection means charging the comingled exhaust and external column with a combustible mixture, and said distributing means comingling the said combustible mixture with the said internal working fluid and combustible mixture thereof for subsequent ignition and burning therewith.

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**3,964,255**

## METHOD OF INFLATING AN AUTOMOBILE PASSENGER RESTRAINT BAG

**Vincent Owen Catanzarite, Las Vegas, Nev., assignor to Specialty Products Development Corporation, Medina, Ohio**

**Continuation-in-part of Ser. No. 234,312, March 13, 1972, abandoned. This application Oct. 17, 1973, Ser. No. 407,268**
**Int. Cl.² C06D 5/00; C06B 29/00, 29/02; B60R 27/00**
**U.S. Cl. 60—205** **12 Claims**

1. A method of inflating an automobile passenger restraint bag comprising the step of substantially completely inflating the bag with the gaseous combustion products of combustion reaction of a composition consisting essentially of an oxidizer compound selected from the group consisting of the chlorates and perchlorates of sodium, potassium, lithium, barium, magnesium and calcium; and an oxygen bearing metal organic compound, said oxygen bearing metal organic compound selected such that a stoichiometric reaction between the oxidizer compound and the metal organic compound yields gaseous products selected from the group consisting of carbon dioxide and water vapor and non-gaseous products of at least a binary mixture of metal salts having a melting point substantially below the melting point of any of the resultant metal salts and having a net heat of reaction of less than about 1,000 calories per gram, the production of oxidizer compound being no less than the stoichiometric proportion; and wherein the

metal organic compound is selected from the group consisting of metal formates and metal acid oxalates.

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3,964,256

## PRODUCTION OF NON-TOXIC GAS BY COMBUSTION OF SOLID PROPELLANT

**Bernard E. Plantif; Bernard J. Doin, and Jean S. Beaumont, all of Saint-Medard-en-Jalles, France, assignors to Societe Nationale des Poudres et Explosifs**

**Filed Oct. 10, 1973, Ser. No. 405,062**

**Claims priority, application France, Oct. 17, 1972, 72.36739**

**Int. Cl.² C06D** *5/00*

**U.S. Cl. 60—219** **11 Claims**

1. A process for the rapid production of a substantial volume of non-toxic gas at a moderate temperature, which comprises the steps of:

a. effecting combustion of a pyrotechnic charge consisting of a composite solid propellant having a high content of inorganic non-nitrogenous oxidant in excess of 80 percent said inorganic oxidant being selected from the group consisting of alkali metal and alkaline earth metal perchlorates and a low content of a carbonaceous, oxygen-containing, binder not exceeding 17 percent, said binder being selected from the group consisting of cellulose triacetate and silicone resins, the remaining ingredients being free of nitrogenous compounds; in a combustion chamber to produce a substantial volume of combustion gases at an elevated temperature,

b. passing the hot combustion gases through a first cooling phase in which the hot combustion gases are diluted with oxygen obtained by the thermal decomposition of an oxygen-containing inorganic compound which has a low thermal stability and liberates, in gaseous form, only oxygen, whereby the combustion gases are cooled to a temperature of from 225° to 700°C, and

c. passing the gaseous mixture from step (b) to a second cooling phase in which the gas mixture from the first cooling phase is cooled by contact with cooling means to the temperature of utilization.

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3,964,257

## DEVICE FOR BOOSTING AND BLEEDING A GAS TURBINE ENGINE

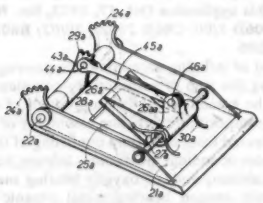
**Alain Marie Joseph Lardellier, Melun, France, assignor to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation, France**

**Filed Feb. 7, 1975, Ser. No. 548,147**

**Claims priority, application France, Feb. 11, 1974, 74.04489**

**Int. Cl.² F02C** *3/06*; **F02K** *3/06*

**U.S. Cl. 60—226 R** **14 Claims**




1. A device for boosting and bleeding a gas turbine engine such as a gas turbine jet engine used for aircraft propulsion, said engine being of the kind comprising at least two independent rotating stages, namely a low-pressure rotating stage comprising a low-pressure compressor, and a high-pressure rotating stage comprising a high-pressure compressor, said engine comprising a primary duct through which, in operation, there flows a primary airflow passing successively across the low-pressure compressor and the high-pressure compressor, said primary duct being separated by a casing, from an air space located outside the duct, said device for boosting and venting comprising at least one main duct starting in the primary duct section defined between the low-pressure compressor and the high-pressure compressor, and establishing communication, across said casing, between said primary duct section and said air space and, at least one main shutter element, movable in relation to said main duct and capable of occupying an open position, in which said main duct is open, and a closed position in which said main duct is closed, at least one auxiliary duct formed across said main shutter element and likewise placing said primary duct section in communication with said air space, and at least one auxiliary shutter element movable in relation to said auxiliary duct and capable of occupying an open position in which said auxiliary duct is open, and a closed position in which said auxiliary duct is closed which auxiliary shutter element is part of said main shutter element.

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3,964,258

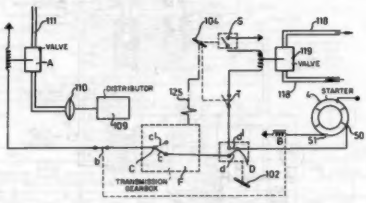
## REDUCING UNDESIRABLE COMPONENTS OF AUTOMOTIVE EXHAUST GAS

**Gaetano Romano, and Bruno Gorietti, both of Rome, Italy, assignors to Exxon Research and Engineering Company, Linden, N.J.**

**Filed Aug. 1, 1973, Ser. No. 384,749**

**Int. Cl.² F02B** *75/10*

**U.S. Cl. 60—274** **8 Claims**




1. A method of operating an automotive engine system having a carburetor for producing an air-fuel mixture, choke means for enriching the air-fuel mixture, an intake manifold for passing the air-fuel mixture to the engine, a throttle for regulating the passage of the air-fuel mixture to the engine, a spark ignition system for igniting air-fuel mixture in the engine, an exhaust system comprising an exhaust conduit and an exhaust gas purifying reactor; and means for recycling a part of the exhaust gas from the exhaust conduit to the engine, comprising the steps of: providing communication of the intake manifold pressure to a pressure responsive device which is operative on the timing of the spark ignition system when said choke means is operative and the engine system is in at least one of the following predetermined operating conditions comprising idling, low load, and said reactor having a temperature below its minimum effective working temperature, for exerting a retarding action on the ignition spark timing of said spark ignition system in accordance with the communicated intake manifold pressure by means of said pressure responsive device; interrupting the communication of the intake manifold pressure with said pressure responsive device when the engine is in at least one of the following conditions comprising said choke means being inoperative, the engine system operating mode being at a speed exceeding idling, the engine system operating mode being at a load exceeding low load, and the reactor temperature being at least at its minimum effective working temperature; recirculating said exhaust gas when the engine is in at least one of the following conditions comprising said choke means being inoperative, the engine system operating mode being a driving mode, the engine system operating mode being at a load exceeding low load, and the reactor being at least at its mini-

mum effective working temperature; and interrupting the recirculation of said exhaust gas when the engine is in at least one of the following conditions comprising said choke means being operative, the engine system operating mode being substantially at an extreme load condition, the engine system operating mode being substantially at an extreme speed condition, and the reactor temperature being below its minimum effective working temperature.

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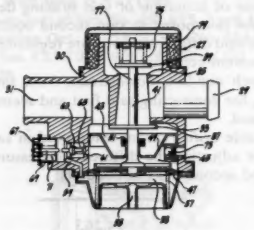
**3,964,259**

## MULTI CONDITION RELIEF VALVE

**John B. Fitzgerald, St. Louis, Mo., assignor to ACF Industries, Incorporated, New York, N.Y.**

**Filed Aug. 6, 1973, Ser. No. 385,967**
**Int. Cl.² F02B 75/10**
**U.S. Cl. 60—290** **2 Claims**



**1.** For use in a combustion engine exhaust system of the type wherein forced air is injected into an exhaust pipe through a forced-air passage, an automatically-actuated bypass valve for controlling the flow of said forced-air through said forced-air passage, said automatically-actuated bypass valve comprising:

a valve body having inlet, outlet and bypass ports, said inlet port for communicating with a forced-air source, said outlet port for communicating with said exhaust pipe, and said bypass port for communicating with atmosphere;

a main valve seat located between said inlet and outlet ports;

a bypass-valve seat located between said inlet and bypass ports;

a passage between said seats;

a valve stem located in said passage having affixed thereto a main valve head and a bypass valve head, one for each of the respective seats;

a valve-stem actuating means for holding said valve stem in a position wherein said main valve head is unseated and said bypass valve head is seated under conditions of steady state combustion engine speeds but for responding to high engine accelerations, and high engine decelerations by moving said valve stem to a position where said main valve head is seated and said bypass valve head is unseated;

said valve-stem actuating means further comprising a diaphragm assembly secured to an end of said stem, a first biasing means for urging said diaphragm assembly toward a main-valve-head-seated position, said diaphragm assembly being secured to said valve body, with said valve body defining a manifold-vacuum chamber for communicating with an inlet manifold of said combustion engine on one side of said diaphragm assembly and a reference vacuum chamber on the other side of said diaphragm assembly, said manifold-vacuum chamber and said reference vacuum chamber communicating with one another via an equalizing passage; and,

an equalizing valve located in said equalizing passage including a second biasing means for biasing said equalizing valve toward a closed position, and an equalizing valve actuating means for opening said equalizing valve in response to an increase in vacuum by a predetermined amount in said manifold-vacuum chamber;

wherein a low manifold vacuum corresponding to a high acceleration of said combustion engine, in said manifold-vacuum chamber is insufficient to overcome said first biasing means and said first biasing means maintains said main valve head in a closed position, a high manifold vacuum, corresponding to a high deceleration of said combustion engine, acts on said equalizing-valve actuating means to open said equalizing valve so that said first biasing means maintains said main valve head in a closed position and, intermediate manifold-vacuums corresponding to intermediate steady-state speeds of said combustion engine act on said diaphragm to overcome said first biasing means and open said main valve.

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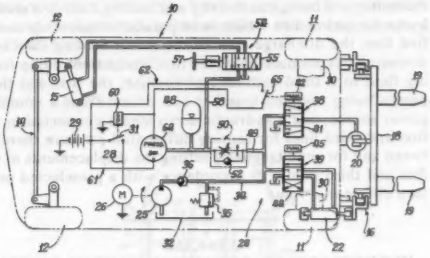
**3,964,260**

## ENERGY CONSERVATION APPARATUS FOR AN ELECTRIC VEHICLE

**Thomas O. Williams, Dunlap, Ill., and Arthur F. Grant, Pittsburgh, Pa., assignors to Towmotor Corporation, Mentor, Ohio**

**Filed May 27, 1975, Ser. No. 581,405**
**Int. Cl.² F15B 1/02**
**U.S. Cl. 60—413** **8 Claims**



**8.** A hydraulic system for an electric vehicle including an electric motor and a battery for driving such motor, comprising:

a single hydraulic pump operatively driven by said motor;

a first hydraulic circuit for a work implement disposed within said hydraulic system and having a manually actuatable control valve, said control valve being infinitely positionable between a closed center position and a fully actuated position for selectively controlling fluid pressure from the hydraulic system to its work implement;

means for automatically energizing said motor when the control valve is moved past a predetermined intermediate position toward its fully actuated position so as to provide fluid pressure from said pump to the hydraulic circuit under such conditions;

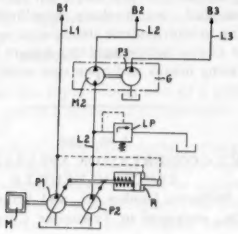
a second hydraulic circuit disposed within said hydraulic system in parallel with said first circuit; and

means including a hydraulic accumulator disposed within said hydraulic system for storing fluid energy produced by said pump in excess of that needed for said first hydraulic circuit for subsequent use in powering the second hydraulic circuit without the necessity of running said pump so as to reduce the energy drain on the battery by minimizing the frequency of pump start-ups during operation.

## 3,964,261
## AUXILIARY HYDRAULIC POWER CIRCUIT FOR A HYDRAULIC POWER TRANSMISSION SYSTEM

Bernard M. J. Zukauskas, Saint Quentin Falavier, France, assignor to International Harvester Company, Chicago, Ill.

Filed Jan. 24, 1975, Ser. No. 543,710
Claims priority, application France, Jan. 24, 1974, 74.04421
Int. Cl.² F16H *39/46*; F15B *13/09*
U.S. Cl. 60—445 1 Claim

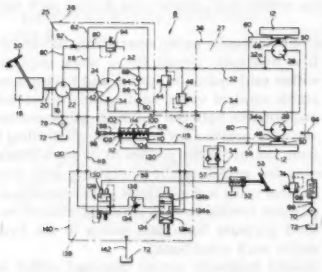



1. In a hydraulic power transmission system having a first pump feeding fluid to a first hydraulic power line; a fluid motor connected in the first line and being powered by fluid therein; a pressure regulating valve connected in the first line between the first pump and motor; a second pump coupled to the motor and being run thereby and feeding fluid to a second hydraulic power line which is in parallel relationship to the first line; the discharge flow of the motor feeding fluid to a downstream continuation of the first line; a third pump feeding fluid to a third hydraulic power line; the first and third pumps being coupled together and driven from a common power source; and a hydraulic servo means connected in the first and third lines for sensing differential pressure therebetween and for simultaneously setting the displacements of the first and third pumps in accordance with a preselected pressure differential value.

## 3,964,262
## HYDROSTATIC TRANSMISSION CONTROL SYSTEM

Jon R. Patton, Jackson, Mich., assignor to Clark Equipment Company, Buchanan, Mich.

Filed June 10, 1975, Ser. No. 583,921
Int. Cl.² F16H *39/46*
U.S. Cl. 60—447 5 Claims



1. In a control system, including a brake device, for a vehicle having a hydrostatic transmission of the type which includes a main hydraulic circuit comprising a variable displacement propulsion pump having a pivotable adjusting member and including a spring-centered adjusting device, and hydraulic motor means, said control system also including a hydraulic control circuit comprising a driving engine, a control pump drivingly connected to said engine so as to rotate at a speed proportional to the speed of said engine, said control pump being in fluid communication with said main hydraulic circuit and said hydraulic control circuit, said hydraulic control circuit including fluid reservoir means in fluid communication therewith, a first or high pressure control conduit, a second or low pressure control conduit, said first and second control conduits being substantially parallel to each other and communicating with said spring-centered adjusting device, directional control valve means interposed in said first and second control conduits, differential pressure regulator valve means interposed in said first and second control conduits upstream from said directional control valve means, said differential pressure regulator valve means being continuously biased to an open position, with said differential pressure regulator valve being operatively connected to said brake device so as to be progressively movable to a closed position in proportion to the degree of actuation of said braking device, and fixed orifice means interposed in said second control conduit upstream from said differential pressure regulator valve, wherein the improvement comprises:

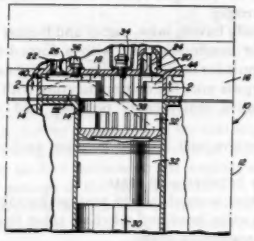
a. a branch conduit, downstream from said fixed orifice means, for connecting said first and second control conduits; and

b. adjustable orifice means interposed in said branch conduit for adjusting the differential pressure between said first and second control conduits.

## 3,964,263
## SIX CYCLE COMBUSTION AND FLUID VAPORIZATION ENGINE

Robert C. Tibbs, Hospital Drive, Cleveland, Miss. 38732

Filed Dec. 31, 1974, Ser. No. 537,657
Int. Cl.² F01K *27/00*; F01B *29/04*
U.S. Cl. 60—618 4 Claims



1. In a combustion engine of the type including a cylinder having a piston reciprocal therein and defining an expansion chamber at one end of said cylinder in constant communication therewith and equipped with intake and exhaust valve means, said expansion chamber having a plurality of heat absorptive fin portions therein, said piston having a plurality of heat absorptive fin portions thereon which project into said chamber during the end portions of the strokes of said piston in said cylinder toward and away from said chamber, injection means operative to inject a measured quantity of atomized readily vaporizable liquid into said expansion chamber for contact with said fin portions, said engine being of the 6-stroke cycle type including a first intake stroke during which said intake and exhaust valve means are open and closed, respectively, second and third compression and power strokes during which said intake and exhaust valve means are closed, a fourth stroke during which said intake and exhaust valve means are closed and open, respectively, a fifth stroke during which said intake and exhaust valve means are closed and said injector means is operable to inject atomized liquid into said expansion chamber, and a sixth stroke during which said intake and exhaust valve means are closed and open, respectively, said fin portions on said piston and at least a majority

of said fin portions in said chamber being disposed, at least generally, in radial planes of the center axis of said cylinder, the piston fin portions and said majority of fin portions in said chamber being disposed in spaced overlapped interdigitated relation during the end portions of the strokes of said piston toward and away from said chamber at the adjacent end of said cylinder, said fin portions on said piston and said fin portions in said chamber being spaced radially outwardly from the longitudinal center line of said cylinder, and ignition means communicated with the interior of said chamber at a point spaced inwardly of the radial innermost ends of said fin portions.

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**3,964,264**

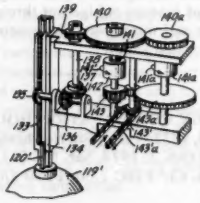
## WAVE-ACTION UNDERSEA-DRILLING RIG

**Michael G. Tornabene, c/o Amanda Machine Corp., 285 Oak Neck Lane, West Islip, N.Y. 11795**

**Continuation-in-part of Ser. No. 457,075, April 1, 1974. This application Oct. 11, 1974, Ser. No. 514,004**

**Int. Cl.[2] E02B *9/00*; F16G *11/00***

**U.S. Cl. 61—20** **20 Claims**



**1.** A wave-action device comprising in combination: a clamp means for intermittently drivably engaging and for thereby transmitting force in a first predetermined direction to a drivable element when engaged with the clamp means, and for intermittently disengaging from engagement with the drivable element during movement of the clamp means in an opposite second direction relative said first direction; float means for effecting an intermittent force to the clamp means being adapted to have predetermined size and mass and buoyancy arranged such that wave-action initiated momentum thereof is sufficient to effect the intermittent force and such that the float means is maintained substantially at water surface level.

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**3,964,265**

## METHOD AND APPARATUS FOR MINING AND SUPPORTING THE MINE ROOF

**Will B. Jamison, Bethel Park, Pa., assignor to Consolidation Coal Company, Pittsburgh, Pa.**

**Division of Ser. No. 391,032, Aug. 23, 1973, Pat. No. 3,871,707, which is a continuation-in-part of Ser. No. 286,744, Sept. 6, 1972, abandoned. This application Oct. 7, 1974, Ser. No. 512,673**

**Int. Cl.[2] E21D *15/44***

**U.S. Cl. 61—45 C** **3 Claims**

**1.** A temporary roof support for use in a mine comprising,

a pair of spaced parallel side beams,

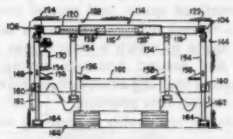
a plurality of spaced parallel telescopic transverse members connecting said side beams and forming a frame member,

a first pair of leg members connected to one of said beam members in spaced relation to each other,

a second pair of leg members connected to the other of said beam members in spaced relation to each other,

each of said leg members having telescopic means to extend and retract said leg members and move said frame member into abutting relation with a mine roof and said leg members into abutting relation with a mine floor to thereby provide support for said mine roof,

support means secured to certain of said leg members and extending outwardly therefrom, said support means arranged to abut portions of a self-propelled mining machine so that said mining machine is operable to support, carry and transport said temporary roof support,



fluid pressure operated means associated with said telescopic means to extend and retract said pairs of leg members and urge said frame member into abutting relation with said roof,

a circuit for said telescopic means and said fluid pressure operated means, and

a pressure accumulator in said circuit to provide a reserve of fluid under pressure for said fluid pressure operated means.

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**3,964,266**

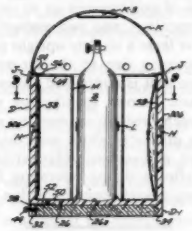
## BUOYANCY COMPENSATING BACK PACK ASSEMBLY

**Ronald D. Bartlett, c/o Metropolitan Water District, Earp, Calif. 92242**

**Filed July 21, 1975, Ser. No. 597,347**

**Int. Cl.[2] B63C *11/22***

**U.S. Cl. 61—70** **7 Claims**



**1.** In combination with a container for pressurized air having a first end portion on which a depth-sensitive control valve is mounted that has first and second air outlets; a first pliable hose having first and second ends, said first end being connected to said first outlet; a first diver's mouthpiece connected to said second end of said first hose; a second pliable hose having first and second ends, said first end of said second hose being connected to said second outlet; a third pliable hose having first and second ends, said third hose having said second hose entering the interior thereof intermediate said first and second ends; a first manually operated valve for controlling the flow of air from said second end of said second hose into the interior of said third hose; a second diver's mouthpiece mounted on said second end of said third hose; a second manually operated valve that may be used to establish communication between said second mouthpiece and the interior of said third hose, said first and second valves being normally closed; a first tubular fitting on said first end of said third hose, a buoyancy compensating back pack assembly that in a first position that is removably securable to a diver to permit him to descend or ascend in a body of water by control of the air-water ratio in said assembly and said asembly when in a

second position being portable and serving as a carrier for a diver's gear such as fins and the like, said assembly including:

a. first and second open-top housings, said first housing including a bottom, said second housing slidably and sealingly engaging the interior of said first housing, said second housing including a transverse cross piece, said second housing when disposed in an inverted first position in said first housing cooperating with the latter to define a confined space, said second housing when disposed in a second upright position in said first housing providing space in which a diver's gear may be stored, said first and second housings having first openings formed therein that are axially aligned when said second housing is in said first position;

b. first means for removably supporting said container in said first housing with said control valve disposed thereabove, with said second housing being of such shape that when in said first position it cooperates with said first housing to define a compartment in which said container is disposed, said first housing having a second opening therein that at all times maintains communication between said compartment and the exterior of said first housing;

c. a diver's harness secured to the exterior of said first housing;

d. second means for removably locking said second housing to said first housing in either said first or second positions;

e. a weight;

f. third means for releasably supporting said weight from said first housing; and

g. a second tubular fitting on said cross piece that may be connected to said first fitting to establish communication between said third hose and confined space when said second housing is in said first position, with a diver wearing said assembly having positioned buoyancy when he first enters the water due to air trapped in said confined space, said assembly providing negative buoyancy to a diver when the diver assumes a diving position to allow at least a portion of said trapped air to escape through said aligned first openings, and said assembly after the diver has assumed at least a slightly upright position providing a desired buoyancy due to the air-water ratio in said confined space that is controlled either by the diver exhaling into said second mouthpiece with said second valve in an open position or opening said first valve to permit air to discharge from said third tube into said confined space, and said assembly serving as a carrier for diver's gear after a diving operation by disposing said second housing in said second position.

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**3,964,267**

**REFRIGERATION CHARGING CYLINDER**

**Clyde G. Phillips, R.R. No. 2, Box 148-G, Angola Beach, Lewes, Del. 19958**

**Filed Mar. 14, 1975, Ser. No. 558,305**

**Int. Cl.[2] F17C** *7/02*

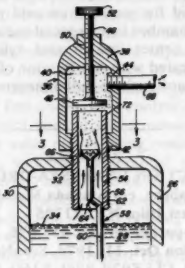
**U.S. Cl. 62—51** **8 Claims**

1. A refrigerant charging cylinder for refrigeration systems, comprising, in combination:

means for drawing liquid refrigerant from the cylinder effected by the flow of saturated vapor flowing from the cylinder comprising;

a. a tank containing a partially liquid and partially gaseous refrigerant and having an opening arranged spaced from a maximum liquid level of the refrigerant when the tank is arranged for charging a refrigeration system;

b. a valve mounted on the tank and arranged partially in the tank opening, the valve including a housing an inlet port and an outlet port provided in the housing, a valve element disposed in the housing between the inlet port and the outlet port for selectively blocking and unblocking passage between the ports, and a saturated vapor pipe connected to the housing and surrounding the inlet port and arranged extending into the tank through the tank opening, the saturated vapor pipe terminating in the tank short of a maximum level of liquid refrigerant in the tank; and



c. a liquid refrigerant pipe having a fluid nozzle thereon arranged in the saturated vapor pipe and extending into the liquid refrigerant in the tank, the liquid refrigerant being carried through the liquid refrigerant vapor pipe by a flow of gaseous refrigerant through the saturated vapor pipe and mixed with the gaseous refrigerant to form a saturated vapor.

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**3,964,268**

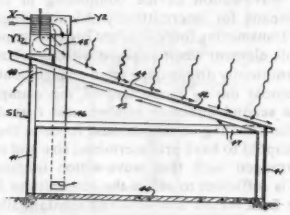
**ENERGY CONSERVATION HOUSING**

**Leonard J. DiPeri, 18325 Lahey St., Northridge, Calif. 91324**

**Filed Oct. 3, 1974, Ser. No. 511,743**

**Int. Cl.[2] F28C** *1/00;* **F28D** *5/00*

**U.S. Cl. 62—121** **17 Claims**



1. A process of rejecting heat at the exterior surface of a building structure, comprising the moving of a blanket of evaporatively cooled humidified air coextensively contiguous to and across the exterior surface thereof subject to the penetration of radiant heat, whereby heat radiating toward the exterior surface is absorbed by evaporative drying of the humidified air and carried off thereby.

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**3,964,269**

**SENSING ARM WATER FILL SHUT OFF FOR ICE MAKER**

**William J. Linstromberg, Evansville, Ind., assignor to Whirlpool Corporation, Benton Harbor, Mich.**

**Filed Nov. 21, 1974, Ser. No. 525,791**

**Int. Cl.[2] F25C** *5/18*

**U.S. Cl. 62—137** **9 Claims**

1. Refrigeration apparatus comprising:

cooling means;

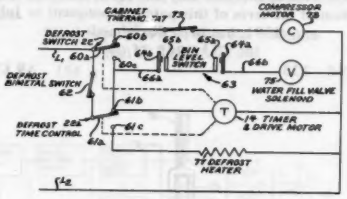
ice making means for automatically making ice bodies including a mold,

water delivery means for delivering water to the mold for cooling thereof by said cooling means to form ice bodies in said mold,

drive motor means;

harvesting means driven by said motor for cyclically harvesting the ice bodies from said mold including a collecting bin for removably storing the harvested ice bodies; and

shut off means preventing operation of said water delivery means whenever the level of ice bodies in said collecting bin is at a preselected full level thereof to permit continued operation of the ice making means by said drive motor while preventing forming of ice bodies thereby, said shut off means including,




a switch means having a plurality of switch contacts for electrically completing a circuit for said water delivery means, said switch means having a spring means for biasing said contacts for making said electrical connection,

and a bin level sensing arm, said arm having a first end in association with said bin for detecting said preselected full level and a second end biased by said spring means and operable in response to detection of said preselected full condition by said first end to prevent said contacts from completing said circuit.

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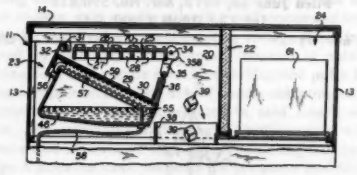
**3,964,270**

## ICE MAKING MACHINE

**Thomas A. Dwyer, Green Bay, Wis., assignor to Liquid Carbonic Corporation, Chicago, Ill.**

**Filed Feb. 28, 1975, Ser. No. 554,394**
**Int. Cl.² F25C** *1/08*
**U.S. Cl. 62—138** **7 Claims**



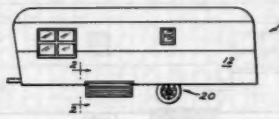
1. In an ice making machine having an ice forming enclosure, a refrigeration system having an evaporator in heat exchange relationship with said enclosure to cool said ice forming enclosure during the freezing cycle; valve means in said refrigeration system permitting the flow of hot refrigerant gas to said evaporator to heat said ice forming enclosure to harvest the ice therefrom during a harvest cycle; water supply means supplying water to said ice forming enclosure; and control means for automatically cycling the machine through freezing and ice harvesting cycles, said control means comprising: a thermostatic switch responsive to temperatures in said ice forming enclosure, a timer in an electrical circuit with said thermostatic switch and said valve means to discontinue freezing of ice and initiate the harvesting of ice after a given time interval, whereby the freezing cycle may be maintained for a period sufficient to insure freezing of water in said ice forming enclosure.

**3,964,271**

## AIR CONDITIONING SYSTEM MOUNTING ARRANGEMENT FOR A MOBILE HOME

**James L. Schulze, Sr., Middletown, Ky., assignor to General Electric Company, Louisville, Ky.**

**Filed Mar. 6, 1975, Ser. No. 555,799**
**Int. Cl.² B60H** *3/04*
**U.S. Cl. 62—239** **3 Claims**



1. An air conditioning system including a mobile home having at least one zone to be air conditioned and a base structure including an interior floor and having longitudinally extending spaced parallel support beams being located inwardly of the outer walls of said mobile home for providing a support area therebetween, distribution means being located between said support beams, said system comprising:

an air conditioning unit being adapted to be removably attached to said mobile home, including a cabinet having air moving means, an air delivery outlet, and air return outlet in the top wall of said cabinet;

said air distribution means including at least one air inlet for receiving air from said air conditioning unit and air outlet for delivering air into said mobile home zone;

mounting means including an adaptor plate attached to said base structure in said support area for removably receiving said air conditioning unit including a first opening aligned with said air conditioning air delivery outlet and a second opening in alignment with said unit's air return outlet when said unit is located in said mounting means;

a first passageway positioned around the peripheral edge portion of said second opening extending upwardly from said plate;

means on the rear edge portion of said adaptor plate being vertically positioned on said mobile home base structure relative to said floor; and

support elements secured between said adaptor plate and said base structure forward of said means on the rear edge of said adaptor plate for positioning said adaptor plate horizontally relative to the mobile home floor and vertically so that the upper free peripheral edge of said first passageway is adjacent the mobile home interior floor.

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**3,964,272**

## AIR CONDITIONING MOUNTING SYSTEM FOR A MOBILE HOME

**Edward Raleigh, Fern Creek, and Bruce L. Ruark, Louisville, both of Ky., assignors to General Electric Company, Louisville, Ky.**

**Filed Mar. 20, 1975, Ser. No. 560,504**
**Int. Cl.² B60H** *3/04*
**U.S. Cl. 62—239** **8 Claims**

1. An air conditioning system including a mobile home having at least one zone to be air conditioned and a base structure, air distribution means associated with said base structure, said system comprising:

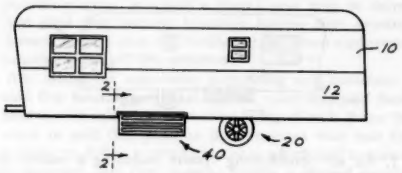
an air conditioning unit including a cabinet having air moving means, air delivery and air return outlets, and being adapted to be removably attached to said mobile home;

said air distribution means including at least one air inlet for receiving air from said air conditioning unit and air outlet for delivering air into said mobile home zone;

mounting means attached to said base structure for removably receiving said air conditioning unit including a first and second opening;

air communicating means including a first passageway connecting said first opening and with said air distribution means for delivering air into said mobile home and a second passageway for connecting said second opening with said mobile home interior so that said air moving means recirculates air through said mobile home;

guide members arranged along the side walls of said air conditioner cabinet;




support members on said mounting means adapted to receive said guide members for removably supporting said air conditioning unit; and

means associated with and interacting between said members for lifting said air conditioning unit into initimate position with said mounting means and for positioning said air conditioner so that said air conditioning unit's air delivery and air return outlets are aligned with said first and second openings respectively in said mounting means during the insertion of said guide members into said support members.

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**3,964,273**

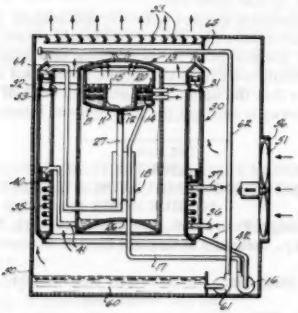
**COMPACT ABSORPTION REFRIGERATION APPARATUS**

**Richard H. Merrick, Evansville, Ind., assignor to Arkla Industries, Inc., Evansville, Ind.**

**Filed Feb. 13, 1975, Ser. No. 549,805**

**Int. Cl.² F25B** *15/06*

**U.S. Cl. 62—476** **10 Claims**



1. An absorption refrigeration apparatus comprising a vapor generator for vaporizing refrigerant from an absorbent liquid to leave a hot stripped solution, a condenser vessel enclosing said generator to condense the refrigerant vapor, a unitary means including an absorber-evaporator vessel for vaporizing the condensed refrigerant and for contacting the stripped solution with the refrigerant vapor flowing from the evaporator to form an enriched solution, said unitary means surrounding the condenser, conduit means to convey the liquid refrigerant to the evaporator and other conduit means to feed the stripped solution to the absorber-evaporator vessel, and apparatus including a pump for circulating the enriched solution flowing from the absorber-evaporator vessel back to the generator together with means for heating the solution in the generator and means for circulating a medium to be cooled in heat-exchanger relationship with the vaporizing refrigerant in the absorber-evaporator vessel.

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**3,964,274**

**NEEDLE FOOT SHOE FOR KNITTING NEEDLE**

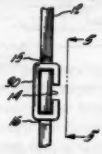
**Edward C. Stivers, Atherton, and Christopher L. Fischer, Sunnyvale, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.**

**Division of Ser. No. 221,906, Jan. 31, 1972, Pat. No. 3,842,626. This application July 24, 1974, Ser. No. 491,327**

**The portion of the term of this patent subsequent to July 23, 1991, has been disclaimed.**

**Int. Cl.² D04B** *35/04*

**U.S. Cl. 66—123** **9 Claims**



1. A knitting machine needle of the type which has a hook at one end and a shaft extending from the hook and a needle foot extending outwardly from said shaft and adapted to ride in a needle foot guide channel having side walls wherein the improvement comprises shoe means positioned over at least that portion of said foot which contacts the side walls of said needle foot guide channel, said shoe means having a shear modulus of at least 1,000,000 pounds per square inch and a loss tangent of at least 0.01.

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**3,964,275**

**TERRY LOOP FORMING INSTRUMENT FOR CIRCULAR KNITTING MACHINE**

**Giovanni Busi, and Pierluigi Belli, both of Brescia, Italy, assignors to Officina Meccanica Giovanni Busi, Sera (Brescia), Italy**

**Filed June 26, 1975, Ser. No. 590,618**

**Int. Cl.² D04B** *35/00*

**U.S. Cl. 66—91** **4 Claims**

1. In a circular hosiery knitting machine including a needle cylinder adapted for rotation and reciprocation, spaced apart vertically extending slots in said needle cylinder for slideably receiving needles therein, and a knitting station including stitch cams for moving said cylinder needles through stitch forming motions and first and second yarn feed guides at said knitting station for respectively feeding terry yarn and body yarn to said cylinder needles, the combination therewith of terry loop forming instruments positioned between said cylinder needles, vertically extending slots in said needle cylinder

between said cylinder needles for slideably supporting said terry loop forming instruments, and cam means supported at said knitting station for raising and maintaining said terry loop instruments at a predetermined level as said cylinder needles are lowered to form stitch loops of both yarns and to form terry loops of the terry yarn.

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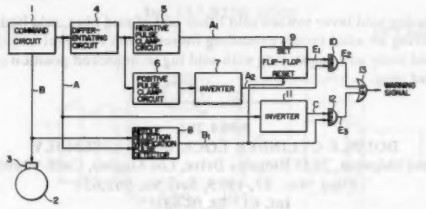
**3,964,276**

## KNITTING ERROR DETECTING APPARATUS FOR CIRCULAR KNITTING MACHINE

**Osamu Nishio, Nagoya, and Nokihisa Adachi, Kasugai, both of Japan, assignors to Okuma Machinery Works, Ltd., Nagoya, Japan**

**Filed Sept. 3, 1975, Ser. No. 610,086**
**Int. Cl.² D04B 15/88**
**U.S. Cl. 66—154 A** **3 Claims**




1. In a circular knitting machine comprising a command circuit for processing a pattern signal for a desired knitting pattern and a needle selecting system disposed in opposition to each yarn feeder on the periphery of a cylinder, said pattern signal being applied to said needle-selecting system after being processed by said command circuit thereby accomplishing a pattern-forming knitting operation while: a knitting error-detecting apparatus comprising a needle selection verification pulse detector impressed with a needle-selecting coil-exciting voltage B and a needle-selecting coil command voltage A and producing a needle selection verification pulse $B_1$, said needle-selecting coil-exciting voltage B making up said pattern signal and being affected by a pulse component induced in a needle-selecting coil when a needle selector in said needle selecting system moves, said needle-selecting coil command voltage A having the same value as said exciting voltage B but being not affected by said pulse component induced in said needle selecting coil, said needle selection verification pulse $B_1$ being a pulse component induced in said needle-selecting coil by the movement of said needle selector in said needle-selecting system, said apparatus indicating a knitting error when the presence and absence of said needle-selecting coil command voltage A does not coincide with the presence and absence of said needle selection verification pulse $B_1$ respectively.

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**3,964,277**

## WEFT KNIT FABRIC WITH DEFLECTED INLAID YARN

**Thomas E. Miles, Box 1307, Lincolnton, N.C. 28092**

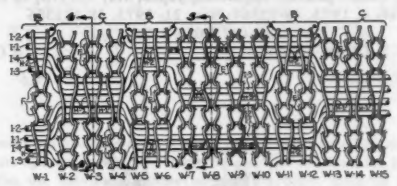
**Filed July 3, 1974, Ser. No. 485,524**
**Int. Cl.² D04B 7/14**
**U.S. Cl. 66—190** **7 Claims**

1. A weft knit fabric having courses and wales of forwardly facing stitch loops on the face side thereof and courses and wales of rearwardly facing stitch loops on the reverse side thereof, the face side of said fabric including

a. first groups of held stitch loops extending over several courses and in spaced apart groups of adjacent wales,

b. second groups of held stitch loops extending over several courses and in spaced apart groups of adjacent wales, said second groups of held stitches being staggered coursewise relative to said first groups of held stitches, said second groups of held stitches being positioned between said first groups of held stitches, and

c. a plurality of inlaid yarns extending behind said first groups of held stitch loops and being held in position by said rearwardly facing stitch loops therebehind, certain of




said inlaid yarns extending behind said first groups of held stitch loops also extending behind said held stitch loops of said second groups of held stitch loops so that said certain inlaid yarns are deflected and extend diagonally between said first and second groups of held stitch loops.

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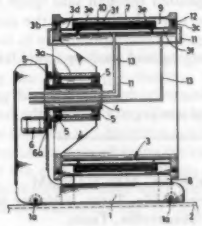
**3,964,278**

## APPARATUS FOR TREATING TEXTILE MATERIALS

**Alfred Korsch, Krefeld, and Friedrich Schneiders, Monchengladbach, both of Germany, assignors to D. Dupuis & Co., Monchengladbach, Germany**

**Filed Sept. 30, 1974, Ser. No. 510,389**
**Claims priority, application Germany, Mar. 16, 1974, 2412731; July 14, 1973, 2335993**
**Int. Cl.² D06B 5/18**
**U.S. Cl. 68—5 E** **6 Claims**



1. Apparatus for the treatment of textile fibers with a fluid medium, comprising coaxial inner and outer cylinders;

support means on said inner cylinder, upon which said textile fiber is wound; one of said cylinders being rotatable, and the other being non-rotatable; means for driving said rotatable cylinder; one of said cylinders being movable axially with respect to the other between a first position in which the inner cylinder is telescoped within the outer cylinder, and a second position wherein the inner cylinder is entirely removed from the outer cylinder; said inner cylinder having axially spaced radial flanges defining end walls that extend outwardly to the inner surface of the outer cylinder; said inner cylinder and flanges cooperating with said outer cylinder to define an enclosed annular treatment chamber for said textile fiber; and means for circulating treatment fluid through said annular chamber as the rotatable cylinder turns relative to said non-rotatable cylinder.

**3,964,279**

## APPARATUS FOR CONTINUOUSLY WASHING A YARN WITH A WASHING LIQUID

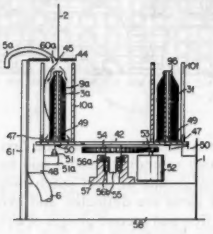
**Yasunori Nagata; Hirotaka Itoh; Susumu Yazaki, all of Osaka; Takayuki Hamamura, Kyoto, and Shigeo Yoshiya, Osaka, all of Japan, assignors to Kanebo, Ltd., Tokyo, Japan**

**Filed Apr. 30, 1974, Ser. No. 465,611**

**Claims priority, application Japan, May 7, 1973, 48-50514; July 4, 1973, 48-75567; Nov. 21, 1973, 48-131306**

**Int. Cl.[2] D06B *1/04, 23/04***

**U.S. Cl. 68—205 R** **2 Claims**



**1.** An apparatus for continuously washing a yarn with a washing liquid, comprising, in combination,

a. a horizontal circular carriage which is rotatable around the center of said circular carriage;

b. a plurality of vertical cylinders for respectively receiving a yarn supply package, in which a yarn is wound on an upright standing bobbin, said vertical cylinders being arranged on said rotatable carriage, each cylinder having a vertical slit formed on its side wall and said slit being open at the upper end of said cylinder,

c. means for securing said yarn packages upright in said vertical cylinders,

d. at least one spout for a washing liquid opening toward the top end of at least one of said packages, so as to allow said washing liquid spouted through said spout to flow down from said top end to the bottom over the outer surface of said package,

e. means for discharging said washing liquid from said cylinders,

f. means for continuously drawing off said yarn upwardly from each of said packages successively.

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**3,964,280**

## LOCKING MECHANISM

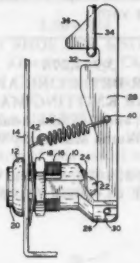
**Grady A. Kelton, Greeneville, Tenn., assignor to Avis Industrial Corporation, Greeneville, Tenn.**

**Filed Apr. 7, 1975, Ser. No. 565,392**

**Int. Cl.[2] E05B *27/00, 65/06, 65/44***

**U.S. Cl. 70—84** **10 Claims**

**1.** In a lockable latch device; a lock body having a key plug rotatable and reciprocable therein, means for receiving a key in said plug at one end to unlock the plug for rotation between locked and unlocked position in the lock body, interengageable cooperating elements on said lock body and plug preventing axial movement of the plug toward the other end thereof in the lock body when in locked position including means forming a shoulder in said body and a lug on said plug which is disposed in opposed relation to said shoulder when the plug is in locked position, the end of said key plug facing the shoulder in said body being adapted to engage the shoulder when the key plug is in unlocked position and is pushed inwardly into the lock body thereby to limit the said inward movement of the key plug in the lock body, a latch lever having one end pivotally supported near said other end of the plug and extending across said other end of the plug to be engaged and pivoted thereby when the plug is moved axially in the direction of the said plug other end, said lever being mounted so that said one end is at one side of the lock body and a free end of the lever being disposed at the opposite side of the lock body, and a spring having one end connected to said lever and



biasing said lever toward said other end of said plug, said body having an axial recess extending therein from the lever end of said body and registering with said lug in unlocked position of said plug.

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**3,964,281**

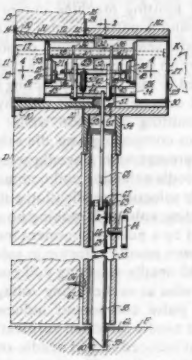
## DOUBLE CYLINDER LOCK BOLT ASSEMBLY

**Paul Shipman, 3835 Ridgeley Drive, Los Angeles, Calif. 90008**

**Filed Mar. 27, 1975, Ser. No. 562,631**

**Int. Cl.[2] E05B *63/15***

**U.S. Cl. 70—120** **10 Claims**



**1.** A lock assembly comprising in combination:

a pair of axially aligned, individually rotatable operating cylinders having means for selective anchorage spaced-apart opposite ends of a transverse bore of a closure, which closure carries a projectable lock bolt, the adjacent inner ends of each cylinder carrying a generally diametrically disposed contact surface projecting toward the adjacent spaced-apart cylinder and extending laterally to both sides of the common axis of said cylinders.

arcuately reciprocable shift means for moving the lock bolt between alternate locked and unlocked positions, said means being located between the spaced-apart cylinders and having a coupling portion arcuately swingable from a pivot point along said common axis with the arcuate portion thereof disposed in operative connection with the lock bolt,

intermediate activating means connecting the inner end of each operating cylinder to the adjacent shift means therebetween, said activating means comprising a pair of crank members each secured to a respective end of said shift means at points coaxial with and adjacent to a respective cylinder, each crank member having an arm laterally

extending to one side of the common axis and disposed to contactingly overlie the adjacent contact-surface and thus to be turned by rotation of said surface, thereby arcuately moving the shift means plus its connected lock bolt between locked and unlocked positions in response to rotation of either operating cylinder.

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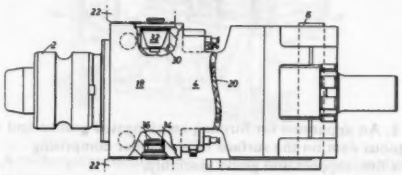
**3,964,282**

## ROLLING MILLS

**Dennis Stubbs; Jack Maltby, both of Sheffield, and Roy Ronald Oxlade, London, all of England, assignors to British Steel Corporation and The British Iron and Steel Research Association, both of London, England**

**Continuation of Ser. No. 511,375, Oct. 2, 1974, abandoned, Continuation of Ser. No. 358,843, May 10, 1973, abandoned.**
**This application Dec. 12, 1975, Ser. No. 640,154**
**Claims priority, application United Kingdom, May 19, 1972, 23715/72**
**Int. Cl.² B21B *37/06***
**U.S. Cl. 72—19** **10 Claims**



1. A rolling mill stand, comprising: a frame, a sub-assembly removable from said frame comprising two driveable work rolls, two work roll arms carrying said work rolls, and means for pivotally mounting the two work roll arms so that they are pivotally movable relative to one another to permit adjustment of the work roll gap,

at least one of said work roll arms being movable to a limited extent in the direction of the stock pass line, and

latch means independent of the pivotal mounting means extending between the mill frame and the sub-assembly for releasably holding the sub-assembly to the frame,

two support rolls rotatably carried in said frame and bearing upon said work rolls, said support rolls being mounted on arms pivoted for movement relative to one another,

two load sensing devices disposed between said one work roll arm and their associated support roll arm and on the upstream side of said one work roll arm, one load sensing device being closer to the stock pass line than the other, said devices providing in use signals embodying a measure of the tension in the stock adjacent said mill stand, and

a hydraulic loading device disposed on the opposite side of said one work roll arm from the load sensing devices and on the center line passing between said load sensing devices engageable with said work roll arm for urging said one work roll arm in the upstream direction to apply an equal load to each of said load sensing devices.

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**3,964,283**

## PRODUCTION OF MULTIPLE ELONGATED PRODUCTS SUCH AS WIRE

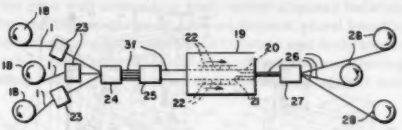
**Francis Joseph Fuchs, Jr., Princeton Junction, N.J., assignor to Western Electric Company, Inc., New York, N.Y.**

**Filed Nov. 13, 1974, Ser. No. 523,401**
**Int. Cl.² B21B *45/02***
**U.S. Cl. 72—42** **56 Claims**

1. Method of simultaneously producing a plurality of elongated products from billet material, said method comprising:

a. coating the billet material with die lubricating material; and

b. passing the coated billet material through a die having a plurality of die apertures extending therethrough in such manner that the billet material and the die lubricating



material are substantially evenly distributed to all of said die apertures, whereby each die aperture is lubricated by the die lubricating material and the billet material is deformed in passing through the die apertures to produce simultaneously a plurality of elongated products therefrom.

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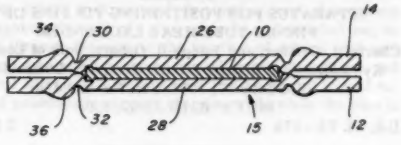
**3,964,284**

## METHOD OF EXPANDING COINS FOR DECORATIVE PURPOSES

**George Boultinghouse, Bartlesville, Okla., assignor to Harold D. Boultinghouse, Bartlesville, Okla., a part interest**

**Filed Nov. 21, 1974, Ser. No. 525,771**
**Int. Cl.² B21D *26/02***
**U.S. Cl. 72—54** **5 Claims**



1. A method of expanding coins having stamping definitions thereon to a larger diametric size than the original size thereof and retaining the stamping definitions thereon which comprises placing the original coin in a carrier means of a larger planar dimension than the coin, applying pressure against the carrier means and coin in a direction substantially perpendicular to the plane of the coin whereby the carrier means and coin flow whereby the coin stretches radially outwardly, and stopping the application of pressure when the carrier means begins to flow outwardly independently of the coin.

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**3,964,285**

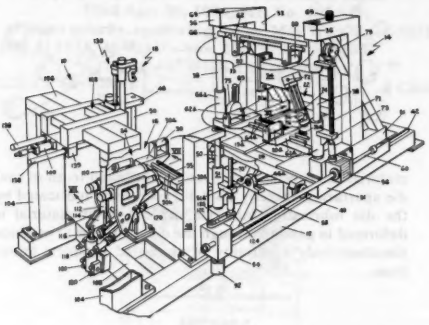
## PIPE CAGE END FORMING MACHINE AND METHOD

**Daniel J. Borodin, Detroit, and Wilbur E. Tolliver, Holland, both of Mich., assignors to New York Wire Mills Corporation, Tonawanda, N.Y.**

**Filed Jan. 20, 1975, Ser. No. 542,342**
**Int. Cl.² B21F *33/00*; B21B *5/00***
**U.S. Cl. 72—69** **49 Claims**

1. An apparatus for forming an end on a pipe reinforcing cage or the like of a different cross section than the rest of the cage, said cage having circumferential reinforcing means, said apparatus comprising: means for engaging said circumferential reinforcing means at one end of said cage, said engaging means including force means for applying a force between two points on said circumferential reinforcing means; and means for applying heat along said circumferential reinforcing means between said two points; said heating means being adapted to generate sufficient heat to lower the yield point of said circumferential reinforcing means sufficiently to allow changing the cross section of the circumferential reinforcing means at

the force level generated between said two points to form said end by changing the length of said circumferential reinforcing



means and thereby changing the cross section of the cage at said one end.

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**3,964,286**

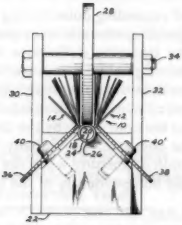
**APPARATUS FOR POSITIONING PIN FINS OF A FINNED-TUBE HEAT EXCHANGER**

**Charles J. Oerther, and Joseph B. Osborn, both of Louisville, Ky., assignors to General Electric Company, Louisville, Ky.**

**Filed June 23, 1975, Ser. No. 589,410**

**Int. Cl.[2] B21D** *53/02, 5/08*

**U.S. Cl. 72—176** **2 Claims**



1. Apparatus for bending individual pin fins of a finned-tube heat exchanger to preselected locations, said finned-tube heat exchanger having first and second rows of pin fins extending radially outwardly from a tube, comprising:

a base having an opening for receiving and slidably supporting the tube;

a wheel connected to the base adjacent the base opening, said wheel being of dimensions sufficient for contacting a portion of the tube between the rows of pin fins and urging the tube into forcible engagement with the base opening; and

first and second toothed wheels connected to the base on opposed sides of the base opening, each of said toothed wheels being of dimensions sufficient for contacting and bending preselected pin fins of a respective pin fin row to preselected locations in response to sliding the finned-tube heat exchanger through the base opening.

**3,964,287**

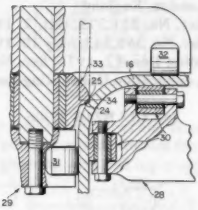
**APPARATUS FOR FORMING A GROOVE AND BACK-UP DAM FOR WELDS**

**Thomas P. Casey, Burlington, Iowa, assignor to Caterpillar Tractor Co., Peoria, Ill.**

**Division of Ser. No. 469,337, May 13, 1974, Pat. No. 3,921,728. This application Feb. 28, 1975, Ser. No. 554,247**

**Int. Cl.[2] B21D** *13/04;* **B23K** *31/02*

**U.S. Cl. 72—210** **3 Claims**



1. An apparatus for forming an elongated groove and contiguous dam on the surface of a member comprising

a first support and guide assembly,

a second support and guide assembly disposed adjacent to and in spaced relationship with respect to said first support and guide assembly to define a space of generally constant thickness to support and guide a formed member of generally constant thickness therebetween, and

forming roller means, having an annular cutting edge formed on the periphery thereof, rotatably mounted on one of said first and second support and guide assemblies for forming a groove in and a contiguous dam on a surface of a member.

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**3,964,288**

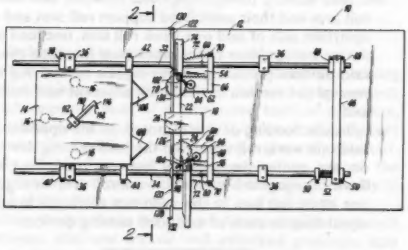
**APPARATUS FOR ASSEMBLING A FRAME**

**Julius M. Minkow, 69 Washington St., Brooklyn, N.Y. 11205**

**Filed May 22, 1975, Ser. No. 579,837**

**Int. Cl.[2] B21D** *53/74*

**U.S. Cl. 72—306** **19 Claims**



1. Apparatus for assembling a frame including first, second, third and fourth sides having their ends secured together to define a strip member before assembly thereof with the first and fourth sides being at opposite ends of the strip, said apparatus comprising a base member, a first pair of arms, first mounting means disposed on said base member for pivotally securing said arms to permit said arms to pivot towards each other, said arms including holding means for holding the second and third sides of the frame so that the second and third sides pivot with said arms, a second pair of arms, and

second mounting means disposed on said base member for pivotally securing said second pair of arms to permit said second pair of arms to pivot towards each other after said first pair of arms have been pivoted, whereby said second pair of arms move the first and fourth sides of the frame together to provide an enclosed frame structure.

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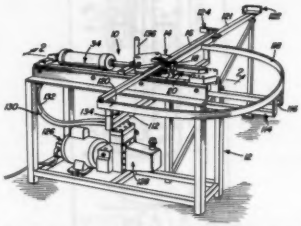
**3,964,289**

## RECTANGULAR METAL-TUBING BENDER

**John C. Williamson, Jr., 2318 Louise Lane, Billings, Mont. 59102**

**Filed Dec. 3, 1974, Ser. No. 529,215**
**Int. Cl.² B21D** *5/02*
**U.S. Cl. 72—381** **7 Claims**



1. A rectangular tubing bender, comprising, in combination:
a. a frame;
b. holding means for locking a rectangular tube to be bent in place on the frame;
c. squeezing means for forming depressions on opposite sides of the tube;
d. forming means for bending the tube into a closed corner about the depressions therein; and the holding means (b) includes a carriage mounted on the frame for reciprocal movement with respect to the frame, and a support member mounted on the carriage, the support member including a pair of pivotally mounted portions, each portion including a pair of substantially parallel, opposed, spaced flanges connected together by a web, the flanges being arranged for receiving therebetween a tube to be bent, and the web being arranged for forming substantially a V-shape to conform to the tube as same is being bent by the forming means; and the forming means (d) further includes a forming point member affixed to the frame and arranged for cooperating with the support member to bend a tube to be bent, and the holding means (b) further including drive means for sequentially moving the carriage toward the forming point member; and the squeezing means (c) includes a pair of rockers pivotally mounted on the carriage about substantially parallel axes arranged between ends of the rockers for providing each rocker with a pair of arms, a squeezing jaw mounted on one arm and a cam follower mounted on the other arm, the jaws, and cam followers, arranged opposite one another, and cam means mounted on the frame for operatively engaging the cam followers and pivoting the jaws toward one another and forming depressions in the tube.

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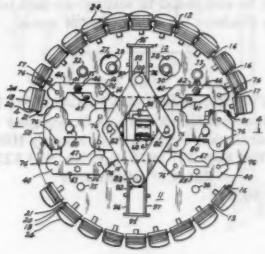
**3,964,290**

## INTERNAL PIPE BENDING MANDREL

**Marvin L. Auxer, P.O. Box 1551, Houston, Tex. 77001**

**Filed Dec. 20, 1974, Ser. No. 534,822**
**Int. Cl.² B21D** *9/00*
**U.S. Cl. 72—466** **30 Claims**

1. Internal mandrel for supporting the walls of a pipe while the pipe is bent, comprising first plate means having a generally arcuate edge generally conforming to one side of the interior wall of the pipe, second plate means spacedly aligned across the pipe from said first place means having a generally arcuate edge generally conforming to the other side of the interior wall of the pipe, means for moving said first and second plate means between retracted more closely spaced positions relatively farther spaced from the pipe wall and expanded less closely spaced positions relatively closer spaced from the pipe wall comprising body means disposed between the first and second plates of each set thereof, plural knuckle member means pivotally connected between said body means and each of said first and second plate means and each having oppositely facing load bearing surfaces bearing against said



body means and one of said first and second plates, and drive means for moving said body means parallely of said first and second plate means to change the angles of said knuckle member means to force said first and second plate means apart against the walls of a pipe, whereby said mandrel may be moved through the pipe to the location of a bend with said first and second plate means in said retracted positions and said first and second plate means may be moved to said expanded positions to support the pipe walls while the pipe is bent.

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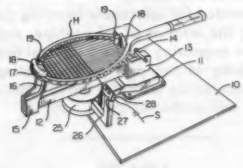
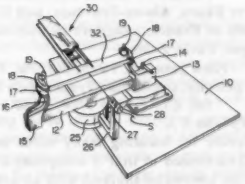
**3,964,291**

## TENNIS RACQUET STRINGING CALIBRATOR

**John M. Ogden, 6540 Parkland, Cincinnati, Ohio 45233**

**Filed Oct. 2, 1975, Ser. No. 618,791**
**Int. Cl.² G01L** *5/06*
**U.S. Cl. 73—1 B** **11 Claims**





1. A device for calibrating a tennis racquet stringing machine where during stringing a racquet is secured on the machine and racquet strings are installed at a preset number of pounds of tension comprising:

a. a cross member that is securable to the stringing machine;
b. a frame secured to said cross member and extending outwardly therefrom;
c. a resistance member secured to said frame and being preset to offer a certain resistance to pull along said frame; and
d. an elongated element secured to said resistance member and being pullable axially with respect to said frame in the same general plane that a racquet string would be pulled, whereby upon handling said element in similar fashion to a string being installed in a racquet, the resistance member will indicate the pounds of pull on said member which can then be compared to settings on said tennis racquet stringing machine for calibration of same.

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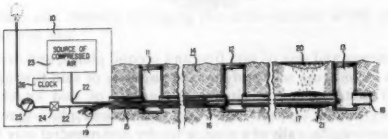
**3,964,292**

## GAS DETECTING APPARATUS AND METHODS

**Jesse Milne Jackson, Greensboro, N.C., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Feb. 27, 1975, Ser. No. 553,522**
**Int. Cl.² G01M 3/04**
**U.S. Cl. 73—40.5 R** **3 Claims**




1. In a gas monitoring apparatus comprising tubing for extension into an environment to be monitored, means for causing at least some gases to exit from said tubing and means for monitoring the exiting gases to detect the presence of a particular gas, the wall of said tubing being readily permeable to said particular gas and, furthermore, said tubing is structured so that said particular gas can enter said tubing only by permeating its wall, an improvement characterized in that

said tubing extends through an environment which is of a character so that said particular gas may occur at a location adjacent to said tubing,

means are provided for selectively blocking the passage of gases along the interior of said tubing, and means are provided for measuring the time interval beginning from the unblocking of the passage and ending when said means for monitoring indicates the substantial maximum intensity of said particular gas.

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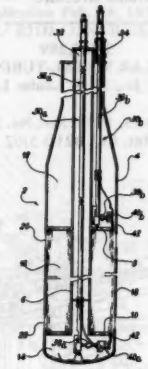
**3,964,293**

## DEVICE FOR LOCATING AND/OR OBTURATING LEAKY TUBES IN HEAT-EXCHANGERS

**Jean-Pierre Faure, Aix-en-Provence, and Gilbert Michot, Pertuis, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France**

**Filed June 30, 1975, Ser. No. 591,444**
**Claims priority, application France, July 8, 1974, 74.23715**
**Int. Cl.² G01M 3/24; F28F 11/04**
**U.S. Cl. 73—40.5 A** **9 Claims**

3. A device for locating leaky tubes and obturating said tubes, characterized in that it comprises a vertical stem provided, at the lower end thereof, with an arm at right angles to said stem end of variable length, the free end of said arm being integral with an assembly carrying a vertical axis deformable capsule capable of penetrating into one of said tubes and of obturating said tube once deformed, and at least one ultrasonic transducer, the said transducer or transducers having vertical axes, means integral with said assembly for causing said capsule to be deformed, means for dissociating said capsule from said assembly, means for causing said arm to rotate



about the vertical axis of said stem, means for moving said arm vertically and means for causing the length of said arm to vary.

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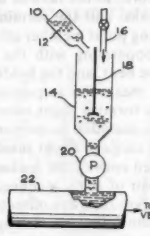
**3,964,294**

## TECHNIQUE AND SYSTEM FOR CODING AND IDENTIFYING MATERIALS

**Frederick H. Shair, Altadena; Peter G. Simmonds, La Canada; Robert B. Leighton, Altadena, and Peter J. Drivas, Pasadena, all of Calif., assignors to California Institute of Technology, Pasadena, Calif.**

**Continuation of Ser. No. 234,201, March 13, 1972, abandoned. This application Nov. 1, 1974, Ser. No. 519,990**
**Int. Cl.² G01N 31/08**
**U.S. Cl. 73—53** **12 Claims**



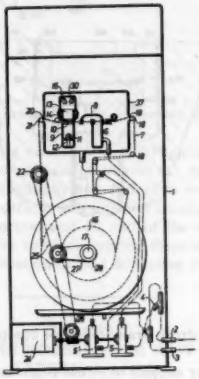

1. A method of tagging a material for future identification, said material being selected from the group consisting of petroleum crude oil and refined liquid products thereof, comprising the steps of adding to said material microcapsules encapsulating a detectable amount of a readily analyzable coded substance not normally present as a component of said material, dispersing said microcapsules uniformly throughout said material, said microcapsules having low solubility in said material and low permeability to said substance, collecting a sample of said material containing said microcapsules dispersed therein, concentrating said microcapsules, releasing said tag substance from said microcapsules and analyzing said substance by electron-capture gas chromatography.

3,964,295

## METHOD AND DEVICE FOR ASCERTAINING SMALL AMOUNTS OF OIL IN WATER

Börje Harald Stenstrom, Enebyberg, Sweden, assignor to Salen & Wicander AB, Sundbyberg, Sweden

Continuation-in-part of Ser. No. 340,152, March 12, 1973, abandoned. This application Aug. 6, 1974, Ser. No. 495,179
Int. Cl.² G01N 21/06
U.S. Cl. 73—61.1 R 8 Claims



1. A method for continuously determining the oil content of a water stream containing small amounts of oil, comprising the steps of:

a. continuously removing a representative sample of said water stream,

b. continuously passing said representative sample of said water stream through a moving mass of filter material which is capable of removing at least a portion of the oil contained in said representative sample,

c. subjecting said moving mass of filter material containing removed oil to photo-electric analysis to thereby obtain an indication of the color changes in the filter material, and

d. passing said filter material through a zone where hydrocarbon gases can evaporate from said filtering material,

e. obtaining an indication of the amount of hydrocarbon gases evaporated in said zone by gas detecting means, and

f. correlating the oil color change indication obtained by photo-electric analysis with the indication of the amount of hydrocarbon gases to arrive at an indication of the oil content of the water.

3,964,296

## INTEGRATED ULTRASONIC SCANNING APPARATUS

Terrance Matzuk, 154 Eileen Drive, Pittsburgh, Pa. 15214

Filed June 3, 1975, Ser. No. 583,242
Int. Cl.² A61B 10/00; G01N 29/04
U.S. Cl. 73—67.5 R 140 Claims

1. An integrated closed ultrasonic scanner comprising

a sealed housing having at least one mechanically compliant wall,

an acoustically conductive liquid disposed within said sealed housing,

an endless belt disposed within said housing and mounted for orbital movement therewithin,

at least two piezoelectric transducers secured to said endless belt,

drive means disposed within said sealed housing for driving said endless belt to establish orbital movement of said transducers,

magnetic commutation means for energizing said transducers and transferring acoustical function electrical signals to the exterior of said sealed housing,

electrical cable means operatively associated with said magnetic commutation means and said drive means and being in communication with the exterior of said sealed

housing for cooperation with external signal processing means and an electrical energy source,

a fresnel deflecting lens disposed between said endless belt and said mechanically compliant wall, and

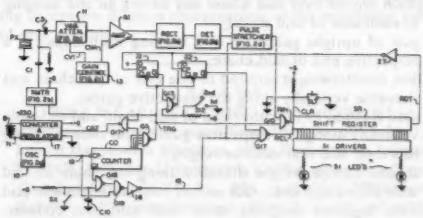
means for reciprocating said fresnel lens in a direction generally perpendicular to the direction of travel of said orbiting transducers.

3,964,297

## ULTRASONIC INSPECTION APPARATUS

Hans G. Jorgensen, and B. Wendell Hautaniemi, both of Ithaca, N.Y., assignors to Ithaco, Incorporated, Ithaca, N.Y.

Filed Dec. 16, 1974, Ser. No. 532,889
Int. Cl.² G01N 29/04
U.S. Cl. 73—67.8 R 27 Claims



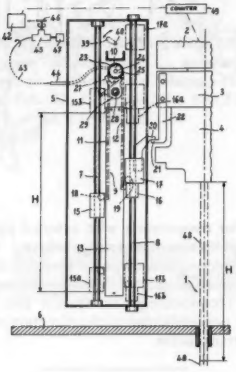

1. Ultrasonic inspection apparatus, comprising, in combination: ultrasonic transducer means for repetitively applying pulses of ultrasonic energy to an object to be inspected and receiving reflected ultrasonic energy from said object to provide trains of first electrical signals; amplifying and detecting means for detecting those of said electrical signals of each train which have amplitudes exceeding a selected threshold value to provide respective logic signals; storage means having a plurality of stages for storing the logic signals resulting from said trains of signals with a distribution among said stages in accordance with their respective times of occurrence during a given train; and a linear array of light-emitting elements controlled by respective stages of said storage means to be illuminated in accordance with the signals stored in said storage means to provide an operator-observable display.

3,964,298

## APPARATUS FOR MEASURING PENETRATION OF TUBES OF A PENETROMETER

Charles Marc Marie Saint-Remy Pellissier, Avignon, France, assignor to Societe Anonyme Fondasol-Technique, Avignon, France

Filed Aug. 4, 1975, Ser. No. 601,447
Claims priority, application France, Aug. 2, 1974, 74.27657
Int. Cl.² G01N *3/42*
U.S. Cl. 73—84 10 Claims



1. An apparatus for measuring the penetration of the tubes driven in by the anvil of a penetrometer, said apparatus comprising:

a housing adjacent said penetrometer;

a wheel rotatable in said housing about a horizontal axis;

a chain reeved over said wheel and having an end hanging to each side of said wheel;

a pair of upright guides in said housing each adjacent a respective end of said chain;

a first counterweight secured to one end of said chain and slideable vertically along the respective guide;

a slide secured to the other end of said chain and slideable vertically along the respective guide, said slide weighing less than said first counterweight;

a second counterweight slideable along the guide of said slide above said slide, said second counterweight and said slide together weighing more than said first counterweight;

an abutment on said second counterweight engageable with said anvil on upward travel thereof, whereby lifting of said anvil lifts said second counterweight;

ratchet means connected to said wheel and displaceabel between an actuated position for preventing rotation of said wheel in a sense corresponding to dropping of said first counterweight and an unactuated position for allowing rotation of said wheel in said sense;

means engageable with said ratchet means for displacing same into said actuated position only after upward displacement of said second counterweight from a predetermined bottom position through a distance equal to the length of one such tube; and

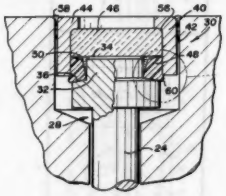
means including a unidirectional clutch for measuring angular displacement of said wheel in a rotational direction opposite said sense.

3,964,299

## STRAIN INDICATOR

Robert Carol Johnson, Pittsburgh, Pa., assignor to Modulus Corporation, Cleveland, Ohio

Filed June 20, 1974, Ser. No. 481,042
Int. Cl.² F16B *31/02*
U.S. Cl. 73—88 F 5 Claims



1. An optical stress-strain indicator comprising in combination:

a first member subject to stress-strain and having a recess extending from an external surface of said member into said member;

a pin member received within said recess and having a first end and a second end, said first end being secured to said first member at an interior portion thereof;

a fluid holding member having a wall portion and a window;

said fluid holding member being at least partially received within said first member and secured to said first member at said wall portion with said window positioned with respect to said first member so as to be visible;

said second end of said pin member received in said fluid holding member;

a light absorbing indicator fluid in said fluid holding member substantially filling said fluid holding member while remaining out of contact with said first member;

an indicator member in said fluid holding member having an indicator area disposed substantially adjacent said window;

sealing means between said pin member and said fluid holding member, said sealing means comprising a sealing member having a portion thereof secured to said fluid holding member with another portion thereof secured to said pin member, said sealing member being flexible to permit relative movement of said pin member with respect to said window;

means permitting the cross-sectional shape of said sealing member to change upon relative movement of said pin member with respect to said window such that the internal space occupied by said fluid in said fluid holding member is always constant with or without movement of said pin member;

means operatively connecting said indicator member with said second end of said pin member, whereby;

upon application of stress to said first member there is accomplished a change in length of said first member with the result that said pin is caused to move axially thereby causing said second end and said indicator member to move simultaneously in the same direction with the consequence that said indicator area moves from said window and indicator fluid is caused to flow between said indicator area and said window, the volume of the space within said fluid holding member containing said fluid remaining constant.

## 3,964,300
## SKI GAUGE

John G. Howe, Jamestown Star Route, Boulder, Colo. 80301

Filed Mar. 17, 1975, Ser. No. 558,696
Int. Cl.² G01N 3/20
U.S. Cl. 73—100 4 Claims

1. A method for measuring the deflection stiffness of a ski, comprising:

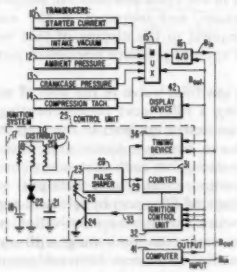
clamping a running surface of said ski against an additional surface at a central portion of said ski; and

positioning a substantially non-deflective measuring device between said surfaces at a selected location intermediate said central portion and an end of the ski, said device being responsive to force exerted thereon by said ski to provide an indication of said deflective stiffness.

## 3,964,301
## ENGINE BRAKE HORSEPOWER TEST WITHOUT EXTERNAL LOAD

Richard Eric Hanson, Woburn, and Thomas Edward Nolan, Jr., Medfield, both of Mass., assignors to RCA Corporation, New York, N.Y.

Filed Oct. 21, 1974, Ser. No. 516,503
Int. Cl.² G01M 15/00
U.S. Cl. 73—116 10 Claims




1. Apparatus for testing an internal combustion engine, comprising

means to operate the engine at an equilibrium speed determined by friction torque with all but one of n ignitions inhibited,

means to decelerate the engine without any ignition, and

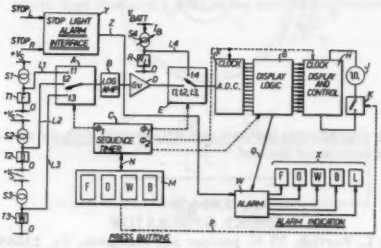
means to measure the average rate of deceleration of the engine during a predetermined deceleration speed range including the equilibrium speed,

whereby the brake torque of the engine is obtained by multiplying the average rate of deceleration by the known inertia of the engine and by $n - 1$.

## 3,964,302
## VEHICLE MONITORING SYSTEM

James Sneddon Gordon, and Carl Siegmund den Brinker, both of Bedford, England, assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 27, 1974, Ser. No. 527,552
Claims priority, application United Kingdom, Dec. 5, 1973, 56388/73
Int. Cl.² G01M 17/00
U.S. Cl. 73—117.3 20 Claims




1. A monitoring system having a single display means for displaying successively the values of a plurality of variables to be monitored; a plurality of signal channels; analog to digital conversion means having a single analog input channel common to all of said signal channels; for each signal channel, individual means for monitoring a respective one of said variables to produce an analog signal having an amplitude characteristic of said variable; means for adjusting the amplitudes of said analog signals to lie within a range of values common to all of said channels; sequence timer means; multiplexer means operable by said sequence timer means to apply said adjusted amplitude analog signals in succession to said common input channel of said analog-digital conversion means for generation of successive digital outputs respectively representing the monitored values of said variables; and display control means for applying said digital outputs (under control) said sequence timer means without storage to said display means for generating successive displays characteristic of the monitored values of said variables.

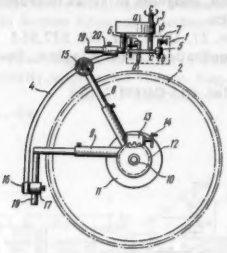
## 3,964,303
## TIRE WEAR MEASURING ARRANGEMENT

Ilya Volfovich Vexelman, ulitsa Kubinka, 5, korpus 2, kv. 192; Leonid Davydovich Sljudikov, ulitsa Bazhova, 15, korpus 2, kv. 167; Alexandr Grigorievich Kutilin, ulitsa Sharikopodshipnikovskaya, 36/18, kv. 306, and Oleg Mikhailovich Kalugin, 2 Novoostankinskaya ulitsa, 2, kv. 10, all of Moscow, U.S.S.R.

Filed Sept. 10, 1973, Ser. No. 396,126
Int. Cl.² G01B 5/08, 5/20; G01M 17/02
U.S. Cl. 73—146 4 Claims

1. A tyre wear measuring arrangement, incorporating: a measuring device adapted to be brought to the tyre tread being measured for measuring the distance from the tyre circmferential surface to the center axis of the tyre; an optical view-finder for locating a point on said tyre circumference; a swivel carrier; means mounting said swivel carrier at a predetermined radial distance relative to the center axis of said tyre, said measuring device and said optical view-finder being mounted on said swivel carrier so that the measuring axis is parallel to and in spaced relationship with the optical axis and both axes are spaced equidistantly from the axis of rotation of said carier, said optical view-finder and said measuring device adapted to be pivoted about said axis of rotation after location

of said point by said view-finder so as to position said measuring device above said point and said measuring device being



axially displaceable towards and into contact with the said tyre for measurement thereof.

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**3,964,304**

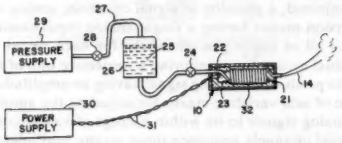
**SMOKE GENERATOR**

**Kemp L. Parrish, 35 N. Juniper St., Hampton, Va. 23669**

**Continuation of Ser. No. 463,924, April 24, 1974, abandoned. This application Apr. 25, 1975, Ser. No. 571,895**

**Int. Cl.² G01M 9/00**

**U.S. Cl. 73—147** **6 Claims**




1. In combination, a wind tunnel for testing models in a moving airflow and a smoke generator disposed within the wind tunnel to produce smoke for visually indicating the airflow in the wind tunnel during a test comprising:

a test section in said wind tunnel containing a model to be tested;

a smoke generator positioned in said test section upstream from the model in such position as not to impede the airflow in said wind tunnel over the model including:

a. an elongated heating means,

b. a liquid conduction means in the form of a coiled tubular conduit encompassing and in close proximity to said heating means and having an inlet and an outlet, and

c. a liquid supply means supplying a smoke-producing liquid to said liquid conducting means and disposed in fluid connection with the inlet of said conduit,

whereby, during a wind tunnel test fluid is supplied to said conduit by said liquid supply means and heated by said heating means to vaporize and produce smoke that exits through the conduit outlet to become entrained in the wind tunnel airflow and pass over the test model to thereby visually indicate tunnel flow over the model.

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**3,964,305**

**APPARATUS FOR TESTING OIL WELLS**

**Gary Q. Wray, and John C. Holden, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.**

**Division of Ser. No. 335,980, Feb. 26, 1973. This application Feb. 19, 1974, Ser. No. 443,598**

**Int. Cl.² E21B 47/00**

**U.S. Cl. 73—151** **9 Claims**

1. An apparatus for use in a test string in an oil well bore for converting applications of fluid pressure in the well annulus between the test string and the well bore into axial movement within said test string, comprising:

a cylindrical tubular external housing assembly having a cylindrical bore therethrough;

a tubular inner barrel assembly having an open bore therethrough and spaced within said housing assembly forming an annular chamber between said inner barrel and said housing assembly for containing a pressurized inert gas;

annulus pressure responsive piston means slidably located within said housing and exposed on one side to fluid pressure in said well annulus and on the second side to the pressure in said annular chamber;

supplementing means between said inner barrel and said housing assembly for supplementing the pressure in said annular chamber with hydrostatic pressure in the well annulus as the apparatus is lowered into the well bore;

valve means having an open position and a closed position for selectively isolating said supplementing means such that hydrostatic pressure in the well annulus while said

valve means is in the open position will actuate said supplementing means, and increases in the well annulus pressure subsequent to the closing of said valve means will move said annulus pressure responsive piston means; and

an annular inert gas filler valve in the wall of said housing assembly having a filler port communicating with said chamber and an activation port in the wall thereof, and including a sleeve having a piston area communicating with said activation port such that said sleeve is moved from a first position closing said filler port to a second position opening said filler port by selective application of hydraulic pressure through said activation port, and a second piston area communicating with said annular chamber for moving said sleeve from said second position to said first position responsive to pressure within said annular chamber when said hydraulic pressure is removed thereby facilitating communication of pressurized inert gas with said annular chamber.

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**3,964,306**

**SYSTEM FOR MEASURING REYNOLDS IN A TURBULENTLY FLOWING FLUID**

**James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of, and Dah Yu Cheng, Palo Alto, Calif.**

**Continuation-in-part of Ser. No. 424,013, Dec. 12, 1973, abandoned. This application Jan. 29, 1975, Ser. No. 545,284**

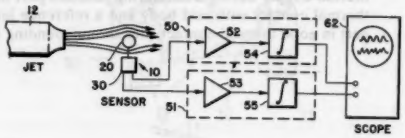
**Int. Cl.² G01M 9/00**

**U.S. Cl. 73—194 R** **10 Claims**

1. A system for measuring Reynolds stress wave in a turbulent fluid comprising:

a sensor with a probe movable about a mainstream direction $u$ and a transverse direction $v$, said sensor having means for generatiang first and second signals representative of the time varying drag forces on said probe about said $u$ and $v$ directions, respectively;

means for generating a third signal proportional to the average density of said fluid; and




circuit means for converting said first, second, and third signals into a signal proportional to the Reynolds stress wave $\rho_0 u'v'$ wherein $\rho_0$ is the average density of the fluid, $u'$ is the instantaneous velocity of the fluid in the $u$ direction, and $v'$ is the instantaneous velocity of the fluid in the $v$ direction.

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**3,964,307**

**VARIOMETER COMPRISING A MEASURING BOX**

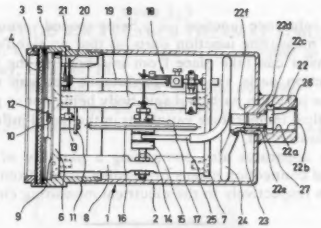
**Dirk Hühne, Frenkendorf, Switzerland, assignor to Revue Thommen AG, Switzerland**

**Filed May 28, 1975, Ser. No. 581,479**

**Claims priority, application Switzerland, Dec. 30, 1974, 17362/74**

**Int. Cl.² G01C *21/00***

**U.S. Cl. 73—179** **7 Claims**




1. In a variometer including a measuring chamber communicating with the atmosphere through a first passageway and an elastically deformable measuring box, positioned within the measuring chamber, communicating with the atmosphere through a second passageway, with one of the passageways being provided with a system of orifice inserts serving to delay the pressure equalization between the measuring chamber and the measuring box, the system of orifice inserts including at least two orifice inserts with successive orifice inserts being separated from each other by an intermediate space, the improvement comprising, in combination, at least one of said orifice inserts being displaceable to vary the volume of one of said intermediate spaces.

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**3,964,308**

**ULTRASONIC FLOWMETER**

**Thomas J. Scarpa, Edison, N.J., assignor to Scarpa Laboratories, Inc., Metuchen, N.J.**

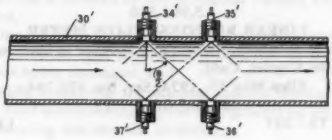
**Division of Ser. No. 394,407, Sept. 4, 1973, Pat. No. 3,891,869. This application Apr. 1, 1975, Ser. No. 564,037**

**Int. Cl.² G01F *1/66***

**U.S. Cl. 73—194 A** **6 Claims**

5. An ultrasonic fluid flowmeter system comprising in combination at least two substantially identical separate transducer assemblies interposed into the pipe section bearing the test fluid in spaced apart relation with their principal axes in a direction substantially normal to the direction of fluid flow in said pipe and oriented to respectively transmit and receive ultrasonic signals directed to and from one another along a path which obliquely intersects the path of fluid flow in said pipe,

circuit means including a source of electrical power in energy transfer relation with each of said transducer assemblies and means for generating and imposing on said transducer assemblies high frequency alternating current electrical signals and for responding to the ultrasonic signals received by said transducer assemblies to form high frequency alternating current electrical signals




and for comparing the signals received in each of said transducer assemblies, said circuit means including a meter calibrated to measure fluid flow in said pipe section as a function of the difference between the signals received by said transducer assemblies,

means including said transducer assemblies each constructed and arranged to generate from each of their radiating faces a radiation pattern comprising a pair of major lobes each oppositely directed at an acute angle to a normal plane relative to the radiating face of said transducer assembly, the principal direction of at least one said lobe conforming to the transmitting and/or receiving path of said signals.

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**3,964,309**

**DEVICE FOR DETERMINING MASS AIR FLOW IN A CONDUIT**

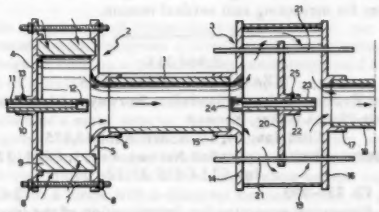
**Massimo Husse, and Mauro Lagonigro, both of Turin, Italy, assignors to Fiat Societa per Azioni, Turin, Italy**

**Filed May 20, 1975, Ser. No. 579,285**

**Claims priority, application Italy, Aug. 1, 1974, 69440/74**

**Int. Cl.² G01F *1/66***

**U.S. Cl. 73—194 A** **4 Claims**




1. In a device for the ultrasonic determination of air speed through a conduit, such as the induction manifold of an internal combustion engine, comprising:

a duct through which passes the air flow to be determined, and

two ultrasonic piezoelectric transducers, one at each end of said duct, adapted to receive and provide signals for computing the air speed in said duct,

the improvement wherein:

said transducers are respectively located in first and second chambers, one at each end of said duct and communicating therewith, said chambers having a greater diameter than said duct,

said first chamber having a peripheral opening such that air flows through said chamber to said duct substantially radially with respect to the axis of said duct, and

a baffle plate in said second chamber, said baffle plate extending transverse the axis of said duct such that air flow through said second chamber, at least in the region between said duct and said baffle plate, is substantially radial with respect to said axis of said duct.

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**3,964,310**

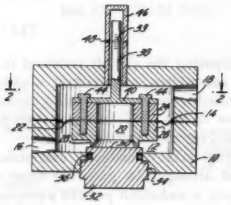
## LINEAR RESPONSE FLOW METER

**Nyyrikki K. Stenberg, Roslyn, Pa., assignor to Dart Industries Inc., Los Angeles, Calif.**

**Filed May 17, 1974, Ser. No. 470,784**

**Int. Cl.² G01F 1/22**

**U.S. Cl. 73—207** **13 Claims**



**1.** A fluid flow measuring device characterized by a highly linear response and substantially constant differential pressure operation comprising a main casing with a flexible partition member peripherally mounted from the lateral walls of said casing, said partition member having a large open area in the central portion thereof and being sufficiently flexible to present negligible structural resistance to measurable vertical motion of its central portion; a rigid, symmetrical collar-shaped fluid control element concentrically mounted on said partition member and extending downwardly therefrom; a cooperating fluid flow control surface on the floor of said casing in directly opposed uniform alignment to and adjacent to said downwardly extending collar-shaped element; a fluid inlet into said casing below said partition member and at a point outside said cooperating fluid control surface; a fluid outlet from said casing above said partition member; and means for measuring said vertical motion.

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**3,964,311**

## MEASURING APPARATUS

**Hans Kristian Holmen, Sandvika, Norway, assignor to A/S Tele-Plan, Lysaker, Norway**

**Filed Jan. 24, 1975, Ser. No. 543,855**

**Claims priority, application Norway, Feb. 1, 1974, 329/74**

**Int. Cl.² G01F 23/22**

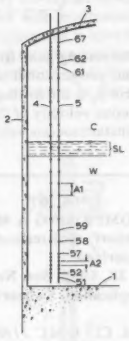
**U.S. Cl. 73—295** **12 Claims**

**1.** Measuring apparatus for determination of the level of a boundary layer between oil and water in a tank, comprising a plurality of electrical sensing units distributed vertically in the tank and adapted to be responsive to the liquid and to deliver measuring signals to electrical measuring circuits with associated display devices for indicating and possibly recording the level, each sensing unit comprising:

a. a body having good heat conducting properties and adapted to be in good thermal contact with the surrounding liquid;

b. an electrical heating resistor in good thermal contact with said body and adapted to be supplied with an electrical current; and

c. a plurality of thermo-couples connected in series, each thermo-couple having a measuring junction part in good thermal contact with said body and a reference junction part in good thermal contact with the surrounding liquid,



the reference junction parts being spaced vertically from the measuring junction parts so that no significant heat transfer can take place from said body to the reference junction parts, the vertical distance between the reference junction parts and said body being not so great that vertical temperature variations in the liquid influence the measurement,

and the apparatus also comprising a plurality of separate electrical connection means for feeding signals from the sensing units respectively to the electrical measuring circuits.

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**3,964,312**

## MAGNETICALLY ACTUATED FLUID-LEVEL INDICATOR

**Rolf Sebek, Oberkinzig, Germany, assignor to Phoenix Armaturen Werke Bregel GmbH, Frankfurt am Main, Germany**

**Filed Apr. 4, 1975, Ser. No. 565,124**

**Claims priority, application Germany, Apr. 8, 1974, 7412308[U]**

**Int. Cl.² G01F 23/12**

**U.S. Cl. 73—314** **16 Claims**

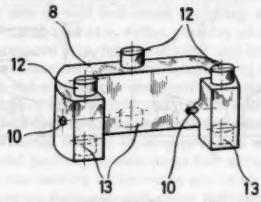
**1.** An element adapted for mass production and being suitable for construction of a variable length magnetically actuated fluid-level indicator for indicating the level of a fluid contained in a vessel having a gauge tube attached thereto and having a magnet-containing float freely floating in the gauge tube, the indicator length being readily adaptable to correspond to the maximum expected variation of fluid level in said vessel, said element being adapted for interlocking with similar elements and comprising:

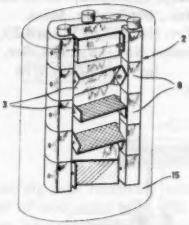
a. a support body having a substantially U-shaped cross section and comprising a first and a second coupling surface;

b. the first of said coupling surfaces including an attaching means;

c. the second of said coupling surfaces including a receiving

means for receiving attaching means of a first coupling surface of a second similar element; and




d. an indicating means comprising a magnetically actuatable platelet rotatably supported by said support body.

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**3,964,313**

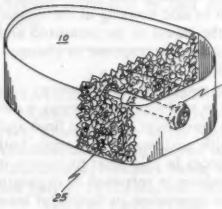
**CANNED FOOD RECYCLABLE THERMAL SIMULATOR**

**Francis G. Connick, Downers Grove, Ill., assignor to Swift & Company, Chicago, Ill.**

**Filed Aug. 21, 1974, Ser. No. 499,296**

**Int. Cl.² G01K *1/08***

**U.S. Cl. 73—343 B** **12 Claims**




**1.** A permanently recyclable simulator device for duplicating the internal thermal characteristics of canned foods, said simulator comprising: a container of the same composition and physical dimensions as the container for the food simulated, a porous open cell matrix material positioned within and substantially filling said container, a liquid uniformly distributed throughout said matrix material when sealed under vacuum, and a suitable thermal recording device permanently attached and extending through a wall of said container to 1/16th inch of a point equal distance from the interior walls thereof, the density and the percentage of open cells of the matrix material in combination with the specific heat of the liquid uniformly distributed therein producing a thermal-conductivity constant substantially identical with that of the canned food simulated.

**9.** A method for artificially reproducing the internal temperature of canned foods during processing, comprising:

interdispersing permanently recyclable artificial canned food simulators with each batch of canned food requiring a heating step during processing,

said simulators having a container housing of substantially similar composition and physical dimension as the canned food simulated,

said container being filled with a porous open celled matrix material and a liquid system uniformly distributed throughout the matrix material when sealed under partial vacuum,

said container being equipped with a suitable thermal indicator positioned to externally record the internal temperature from a point equal distance from all interior walls thereof,

the physical characteristics of the matrix material and the liquid system when packed in combination under a partial vacuum being adjusted to accurately duplicate the thermal characteristics of the particular canned food simulated,

simultaneously subjecting the interdispersed simulators to the identical heat processing procedures as the canned foods being simulated, and

externally measuring the internal thermal conductivity of the food simulated during the heat processing procedures by reading said thermal indicator.

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**3,964,314**

**TEMPERATURE-MEASURING INSTRUMENT**

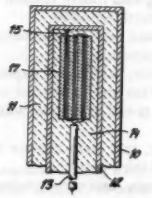
**Heing Brixy, Julich, Germany, assignor to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung, Julich, Germany**

**Filed Mar. 28, 1972, Ser. No. 238,834**

**Claims priority, application Germany, Mar. 29, 1971, 2115033**

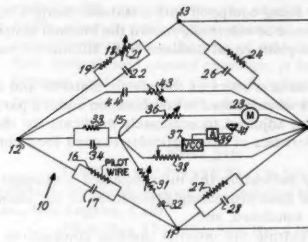
**Int. Cl.² G01K *7/30***

**U.S. Cl. 73—359 R** **4 Claims**




**1.** In a noise-signal temperature-sensing device, the improvement which comprises a temperature sensor including an elongated housing, a thermal-noise-generating strand composed of a metal and wound in a plurality of turns along the length of the housing and received therein, said strand being composed of a metal selected from the group which consists of tungsten, tantalum, molybdenum, niobium, titanium, zirconium, platinum, chromium, nickel and iron, and chromium-nickel-iron alloys, said strand having a cross-section corresponding to a circle with a diameter between 5 and 50 $\mu$, a body of electrically insulating material separating said turns from each other and composed of at least one ceramic selected from the group which consists of alumina, beryllia, thoria and magnesia, and conductors extending into said housing and connected to said strand at spaced apart locations thereof, said strand being a metal film deposited upon an insulating support.

**3,964,315**
**APPARATUS INCLUDING NOVEL BRIDGE CIRCUIT**
**John S. Engelhardt, Hartsdale, N.Y., assignor to The Anaconda Company, New York, N.Y.**
**Filed Jan. 11, 1974, Ser. No. 432,778**
**Int. Cl.² G01K *7/20*; G01R *17/10*, *27/16***
**U.S. Cl. 73—362 AR** **14 Claims**




1. An apparatus for measuring the D.C. resistance of a resistive element carrying an A.C. current component comprising:
A. first, second, third, fourth and fifth conductor junctions, said element being joined to said first and said second junction,
B. a first resistor and a first capacitor, said first resistor and capacitor being joined, in series, to said first and said fifth junction,
C. a second resistor and a second capacitor, said second resistor and capacitor being joined, in parallel, to said second and said fifth junction,
D. a third resistor and a third capacitor, said third resistor and capacitor being joined, in series, to said second and said fourth junction,
E. a fourth resistor, said fourth resistor being joined to said third and said fourth junction,
F. a fifth resistor, said fifth resistor being joined to said first and said fourth junction,
G. a fourth capacitor, said fourth capacitor being joined to said fourth junction and to at least one of said third and said first junctions and in parallel with said resistor joined therebetween,
H. A sixth resistor, said sixth resistor being joined to said second and said third junction,
I. a D.C. power supply, said supply being joined to said third and said first junction, and
J. potential measuring means, said measuring means being joined to said fifth and said fourth junction, whereby said first, second, third and fourth junctions form the terminal points of a D.C. bridge for measuring said resistance and said first, second, fourth and fifth junctions form the terminal points of an A.C. bridge for balancing out said A.C. current component.

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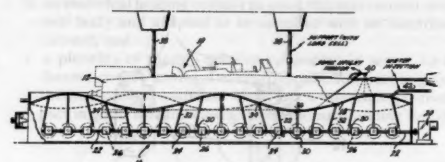
**3,964,316**
**WAVE MOTION SIMULATOR**
**Kyoichi Abe, Chula Vista, Calif., assignor to Rohr Industries, Inc., Chula Vista, Calif.**
**Filed Dec. 23, 1974, Ser. No. 535,504**
**Int. Cl.² G01M *10/00*; B63B *9/08*; G01N *3/32***
**U.S. Cl. 73—432 SD** **18 Claims**

6. Apparatus to generate a wave-like pattern of forces on the underside of a surface effect ship which comprises a flexible membrane activated to simulate water waves, the crests of said waves active on the underside of said ship to transfer forces thereto, and undulating means to undulate said membrane, said undulating means comprising a drive motor, drive shaft means extending the length of the membrane and a



plurality of linkage means interconnecting said drive shaft means and said flexible membrane.

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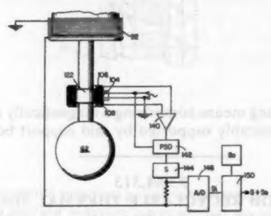
**3,964,317**
**DENSIMETER**
**Robert L. Blanchard, Lexington, Mass., assignor to Foxboro/-Trans-Sonics, Inc., Burlington, Mass.**
**Continuation of Ser. No. 353,573, April 23, 1973, abandoned. This application Nov. 18, 1974, Ser. No. 524,913**
**Int. Cl.² G01N *9/18***
**U.S. Cl. 73—453** **4 Claims**




1. A densimeter, comprising:
A. a housing for complete immersion in a cryogenic liquid whose density is to be measured and ported to admit to the interior thereof said liquid;
B. a float in said housing, said float having a neutral buoyancy position in said housing at the center of a range of densities of the liquid to be measured and mounted for vertical movement in response to changes in the density of said liquid;
C. a permanent magnet in said housing;
D. a force coil in said housing carrying a restoring current mounted for movement with said float and positioned to cooperate with said magnet to apply both upward and downward forces to said float to restore it to its neutral buoyancy position in response to departures therefrom caused by its immersion in liquids of lesser and greater density respectively, said coil carrying a current proportional to the difference between the density of said liquid and the density corresponding to the neutral buoyancy position of said float and generating heating losses corresponding to such difference only.

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**3,964,318**
**DISCONNECT DEVICE FOR AIRCRAFT PITCH OR ROLL CONTROL SYSTEM**
**Donald P. Shutt, Long Beach, Calif., assignor to Western Gear Corporation, Lynwood, Calif.**
**Filed Mar. 3, 1975, Ser. No. 554,509**
**Int. Cl.² G05G *9/00*; F16D *67/02*, *11/06***
**U.S. Cl. 74—471 R** **17 Claims**

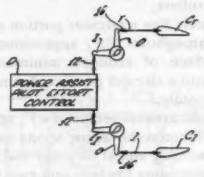
1. In a normally locked disconnect device for use in an aircraft control linkage:
a bell crank adapted for pivotal mounting on an axis on an aircraft structural part, and having input arm means and an output arm interposed in said linkage;

said bell crank having an inner hub rotatable on said axis by said input arm means,

said inner hub having a plurality of circumferentially spaced radial outwardly opening slots in its periphery,

said output arm of said bell crank including an outer hub concentric with said axis, with a plurality of circumferentially interspaced lugs thereon around said inner hub, and with radial slots therebetween adapted for radial alignment with the slots in the aforesaid inner hub,

locking plungers rectilinearly slidable in said radial slots between said lugs of said outer hub and positioned normally in radially inward locking positions wherein they are disposed partially in said outer hub slots and project threfrom into locking reception in said inner hub slots to lock said inner hub and said outer hub against relative rotation,




a lock ring encircling and relatively rotatable about the outer perimeter of said outer hub, with internal arcuate concentric slots adjacent and in engagement with the outer extremities of said locking plungers when said plungers are engaged in said inner hub slots,

said lock ring having a concentric interior circular bearing surface engageable with and rotatable on the outer extremities of said locking plungers to hold them in their said radially inward locking positions in said inner hub slots, said circular bearing surface having circumferentially spaced, radially outwardly extending plunger receiving recesses therein at a circumferential spacing such as to be capable of alignment with said radial slots between said lugs, said recesses being of a depth in the radially outward direction to accommodate complete radially outward extraction of said plungers from said inner hub slots.

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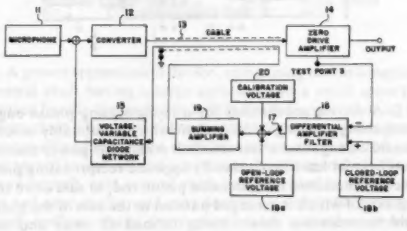
**3,964,319**

## INSTRUMENTATION FOR MEASURING AIRCRAFT NOISE AND SONIC BOOM

**James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of, and Allan J. Zuckerwar, Newport News, Va.**

**Filed July 1, 1975, Ser. No. 592,159**
**Int. Cl.² G01L 11/00**
**U.S. Cl. 73—557** **10 Claims**




1. Instrumentation for measuring aircraft and sonic boom comprising:

a condenser microphone means for varying a capacitor in accordance with the noise picked up by said microphone means;

an oscillator for generating a carrier frequency;

a tank circuit including said capacitor;

voltage-responsive means for tuning said tank circuit to said carrier frequency;

means for applying a voltage to said voltage-responsive means;

a field-effect transistor means connected to receive the outputs from said oscillator and said tank circuit for producing an electrical signal containing said carrier frequency and the variations of said capacitor; and

means for removing said carrier frequency from said electrical signal to obtain an electric current that is proportional to the sound pressure at the microphone.

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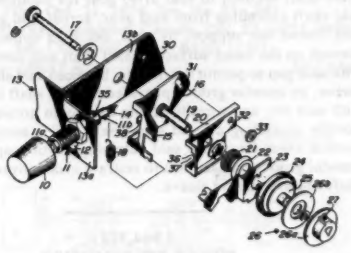
**3,964,320**

## ADAPTABLE TUNER ASSEMBLY

**Frank John Gordon, Chicago, Ill., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed May 2, 1975, Ser. No. 574,123**
**Int. Cl.² F16H 35/18**
**U.S. Cl. 74—10.8** **7 Claims**



1. A radio tuner assembly having a support structure, tuning means mounted on the support structure for selecting a desired station, and tuning drive means adapted to position the tuning means by manual or by pushbutton means, the tuning drive means comprising:

first shaft means rotatably and slideably mounted on the support structure and including a pivot means intermediate the ends of the shaft means for changing the angle of the axis of rotation of a first portion of the shaft means relative to the axis of rotation of a second portion;

manual control means fixedly mounted on the second portion of the shaft means for causing rotation of the latter;

second shaft means rotatably mounted on the support structure;

first gear means mounted on a portion of the second shaft means;

second gear means fixedly mounted on the free end of the first portion of the first shaft means for rotation therewith, the second gear means being adapted to cause rotation of the first gear means; and

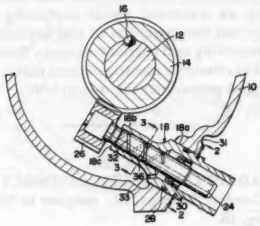
guide bracket means pivotably mounted on the support structure for cooperating with the pivot means of the first shaft means to position the axis of the second gear means in radial alignment with the first gear means.

3,964,321

## FIXING DEVICE FOR SPEED METER DRIVEN GEAR

Nobuaki Katayama, Toyota; Isao Tsuzuki, Kariya, and Mikio Kaneko, Toyota, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Aug. 7, 1974, Ser. No. 495,420
Claims priority, application Japan, June 6, 1974, 49-64302
Int. Cl.² F16H 37/00
U.S. Cl. 74—12 5 Claims



1. An assembly for connecting to a vehicle housing for driving a speedometer, said assembly comprising a sleeve secured to said vehicle housing and having a slit extending therethrough, a drive gear adapted for operative engagement with an output shaft of said vehicle and disposed in a spaced relation to one end portion of said sleeve to define a gap, a drive shaft secured to said drive gear for rotation therewith, said shaft extending from said gear, across said gap and into said sleeve for support by said sleeve, a spiral oil groove formed on the outer surface of said shaft and communicating with said gap to permit lubrication between said shaft and said sleeve, an annular groove provided on said shaft in alignment with said slit, and a resilient clip having an arcuate retaining portion extending around said sleeve and a straight locking portion extending from said retaining portion and into said annular groove and said slit to restrain axial movement of said shaft relative to said sleeve.

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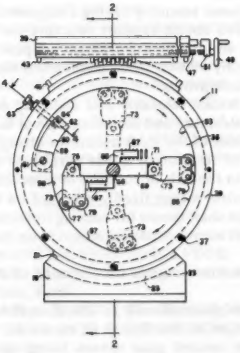
3,964,322

## POWER TRANSMISSION

Reinhold R. Kieper, 19160 Wood St., Melvindale, Mich. 48122

Filed Feb. 27, 1975, Ser. No. 553,598
Int. Cl.² F16H 25/08
U.S. Cl. 74—55 8 Claims



1. A power transmission comprising a base support;
a chambered cylindrical housing mounted on said support, having an end wall and a removable front plate with aligned apertures in said wall and plate on a horizontal axis;
a rotatable crankshaft axially disposed through said housing with portions of said crankshaft journalled and mounted on supports on the exterior and independent of said housing;
at least one pair of equally spaced rods on and projecting radially from said crankshaft within said housing;
a radially adjustable piston pivotally mounted on each rod on an axis parallel to the crankshaft and yieldably biased outwardly in axial alignment with said rod on rotation of said crankshaft;
spring means on each rod engagable with its piston when pivoted approximately 90° with respect to said rod adapted to bias said piston toward alignment with its rod;
cam rollers journalled upon said pistons on axes parallel to the housing axis;
said housing having an arcuate cam bore operatively engaging said rollers;
said bore including a circular portion of uniform maximum radius throughout 225°, approximately; merging into a cam surface of reduced minimum dimension which merges into a circular portion of minimum radius for 90°, approximately;
and a run out arcuate sector of 45°, approximately starting from said minimum radius, at one end pivotally mounted on said housing and at its other end, having a radial step surface extending towards said cam bore at its maximum radius;
each piston as it traverses the circular cam bore portion of maximum radius, being in alignment with its rod, and as it progressively traverses the cam surface of reduced minimum dimension and said run out sector, being pivoted progressively at angles up to 90° relative to its rod;
whereby one piston when traversing the bore of maximum radius has an increased leverage with respect to the other piston simultaneously traversing the cam portions and reduced radius portions of said bore and sector.

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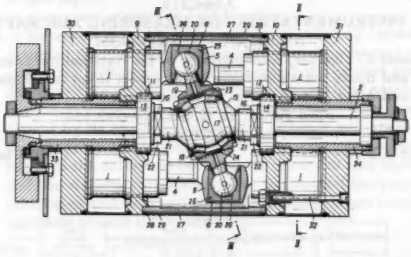
3,964,323

## DRIVING MECHANISM FOR A RECIPROCATING ENGINE

Josef Seibert, Leitgebgasse 2a/11, 1050 Vienna, Austria

Filed Apr. 22, 1974, Ser. No. 462,620
Claims priority, application Austria, Apr. 24, 1973, 3619/73
Int. Cl.² F16H 23/00
U.S. Cl. 74—60 5 Claims



1. A driving mechanism for a reciprocating piston engine, comprising a casing, a drive shaft which is rotatably mounted in said casing, and a transmission means for power transmission from at least two coaxially opposed reciprocating pistons fixedly connected to a common piston rod, to said drive shaft, the axis of which is arranged parallel to the axis of the pistons, said transmission means being formed of inner and outer coaxial ring members which are movable in relation to one another by means of a steep angle bearing around an axis which is inclined to said drive shaft, and which are adjustable

with respect to each other axially of their common axis, said inner ring member being fixedly mounted on said drive shaft, and said outer ring member being provided with at least one extension which is reciprocably mounted in said piston rod of said reciprocating pistons essentially transverse to the moving direction of said pistons.

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**3,964,324**

## FRICTION ROLLERS FOR TWIST TUBES IN FALSE-TWISTING APPARATUS

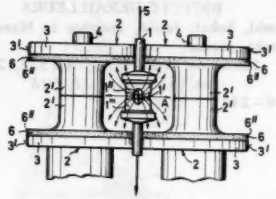
**Hans Gassner, Schweinfurt, and Manfred Kress, Grafenrheinfeld, both of Germany, assignors to Kugelfischer Georg Schafer & Co., Schweinfurt, Germany**

**Filed Apr. 3, 1975, Ser. No. 564,864**

**Claims priority, application Germany, Apr. 10, 1974, 2417627**

**Int. Cl.² D01H 7/92; B21B 27/00**

**U.S. Cl. 74—215** **14 Claims**



1. a friction roller for driving a high-speed twist tube in false-twisting apparatus comprising:

a carrier of an inelastic material;

a radial friction ring peripherally securedaround said carrier, and formed from an elastic material; and

a protective layer having a slinger edge disposed on at least one side of the friction ring.

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**3,964,325**

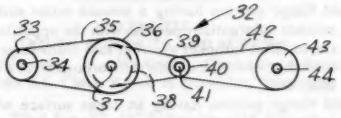
## POWER TRANSMISSION DEVICE

**Robert Rogers, 6 East Lane, Hughestown, Pa. 18640**

**Filed Mar. 17, 1975, Ser. No. 559,242**

**Int. Cl.² F16H 7/00**

**U.S. Cl. 74—219** **1 Claim**



1. A power transmission device, comprising in combination, a central shaft having a large sprocket and a small sprocket mounted fixedly thereupon in axially spaced apart relation, an endless chain around said large sprocket and around a front sprocket affixed on a front shaft, an endless chain around said small sprocket and around a new rear double sprocket affixed on a rear shaft, said central shaft being located between said front and rear shafts, said rear double sprocket also having a second endless chain therearound and around a second sprocket affixed on a second rear shaft spaced from the first said rear shaft, and the first said rear shaft being secured to a drive wheel of a vehicle.

**3,964,326**

## ONE PIECE STAMPED PULLEY

**Frank Mickus, Stickney Township, Cook County, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.**

**Division of Ser. No. 425,453, Dec. 17, 1973, Pat. No. 3,893,818. This application Dec. 30, 1974, Ser. No. 537,232**

**Int. Cl.² F16H 55/44, 55/36**

**U.S. Cl. 74—230.05** **2 Claims**

1. A rotary member including an annular web portion surrounding an integral hub portion extending axially outwardly of each side surface of said web portion, said web portion merging into said hub portion adjacent one side surface thereof, said hub portion including an integral protuberant ridge portion abutting said web portion adjacent the other side surface thereof defining a collar portion supporting said web portion.

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**3,964,327**

## AUTOMATIC SYNCHRONIZED PITCH CONTROLS FOR PAIRS OF DRIVER AND DRIVEN V PULLEY DRIVES

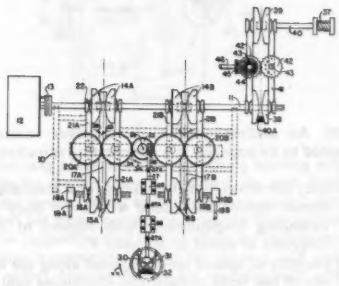
**Andrew Oscar Siren, 1011 Fairmount Drive SE., Calgary, Alberta, Canada**

**Filed Oct. 21, 1974, Ser. No. 516,381**

**Claims priority, application Canada, Oct. 23, 1973, 49282**

**Int. Cl.² F16H 55/52; B62D 11/02**

**U.S. Cl. 74—230.17 A** **12 Claims**



1. A drive mechanism for vehicles and the like having a source of power, comprising in combination with supporting structure, first and second drive pulley assemblies and first and second driven pulley assemblies, a belt operatively extending around said first drive and driven pulley assembly, a further belt operatively extending around said second drive and driven pulley assembly, each of said pulley assemblies including a shaft and a pair of pulley halves splined to said shaft for rotation thereby and endwise movement therealong, means to move the pulley halves of said first drive pulley assembly and said second driven pulley assembly in one direction, and the pulley halves of said second drive pulley assembly and said first driven pulley assembly in the other direction by the same amount and vice versa, said means including a pair of gear components for said first drive and driven pulley assemblies and a pair of gear components for said second drive and driven pulley assemblies, mounted for partial rotation within said supporting structure, each of the gear components of said first drive and driven pulley assemblies being in meshing engagement one with the other, each of said gear

components of said second drive and driven components also being in meshing engagement one with the other, a lever operatively connected intermediate the ends thereof to each of said gear components and being operatively connected by one end thereof to the corresponding halves of said first and second drive pulley assemblies and by the other ends thereof to the corresponding halves of said first and second driven pulley assemblies, control means mounted in said supporting structure and means operatively connecting said control means to each pair of meshing gear components, said last mentioned means including a gear in meshing engagement with one of said gear components of said first drive and driven pulley assemblies and with a corresponding one of said gear components of said second drive and driven pulley assemblies whereby partial rotation of said gear causes simultaneous and equal partial rotation of all of said gear components.

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**3,964,328**

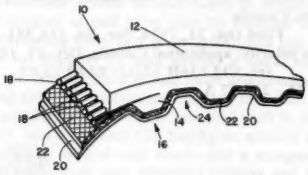
## ELASTOMER-FREE FABRIC SURFACE FOR POWER TRANSMISSION BELT TOOTH FACING

**John D. Redmond, Jr., Denver, Colo., assignor to The Gates Rubber Company, Denver, Colo.**

**Division of Ser. No. 395,084, Sept. 7, 1973, Pat. No. 3,772,929. This application Feb. 28, 1975, Ser. No. 554,262**

**Int. Cl.² F16G** *5/00, 5/20;* **B29H** *7/22*

**U.S. Cl. 74—231 C** **16 Claims**




**10.** An endless positive drive power transmission belt adapted to be engaged in a cooperating sprocket(s) comprising:

a body portion comprising a liquid cast elastomer material;

a tensile section embedded within the body portion and extending longitudinally with respect to the intended direction of travel of the belt;

a plurality of spaced teeth disposed along the inner periphery of the body portion and containing said elastomeric material therein;

a band of wear-resistant fabric comprised of fibers positioned along the outer surface of the teeth, the fibers on the outermost, sprocketengaging surface of the fabric band being substantially free from total encapsulation by said elastomeric material.

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**3,964,329**

## ENDLESS POWER TRANSMISSION BELT

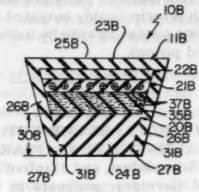
**Jerry D. Wolfe, Springfield, Mo., assignor to Dayco Corporation, Dayton, Ohio**

**Filed Sept. 24, 1975, Ser. No. 616,335**

**Int. Cl.² F16G** *5/16, 5/00*

**U.S. Cl. 74—233** **22 Claims**

**1.** An endless power transmission belt of trapezoidal cross section and made primarily of elastomeric material, said belt having a corrosion resistant cover made solely of elastomeric material, said cover when viewed in cross section being defined by a U-shaped portion having a bight and a pair of legs extending from opposite ends of said bight with said legs terminating in outer ends, and a strip disposed between said outer ends, said U-shaped portion and strip being a unitary




elastomeric mass which serves to isolate and shield the entire belt.

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**3,964,330**

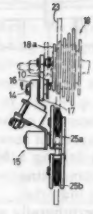
## CHAIN GUIDE CONNECTOR DEVICE FOR USE IN BICYCLE DERAILLEURS

**Nobuo Ozaki, Sakai, Japan, assignor to Maeda Industries, Ltd., Osaka, Japan**

**Filed Nov. 8, 1974, Ser. No. 522,125**

**Int. Cl.² F16H** *7/22, 7/18*

**U.S. Cl. 74—240** **7 Claims**




**1.** A protective device for use in bicycles including a rear derailleur containing a shifter body and a hook-shaped bracket and a multi-stage free wheel assembly containing a plurality of sprocket wheels, said protective device comprising

an internally threaded cylindrical portion and

a flange portion extending integrally from one end of said cylindrical portion,

said cylindrical portion being in screw engagement with a mounting bolt which is employed for clamping said shifter body to the hook-shaped bracket in the bicycle rear derailleur,

said flange portion having a smooth outer surface which extends substantially parallel with the opposite surface of the smallest sprocket wheel of said multi-stage free wheel assembly when the device is incorporated in a rear derailleur, and

said flange portion having an outer surface which has a sufficient size and shape to prevent the chain of the mutli-stage free wheel assembly from becoming disengaged from the smallest sprocket wheel.

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**3,964,331**

## DAMPER APPARATUS

**Benjamin Duncan Oldfield, Cheadle Hulme, England, assignor to Renold Limited, Manchester, England**

**Filed June 23, 1975, Ser. No. 589,528**

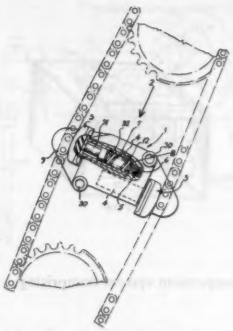
**Claims priority, application United Kingdom, June 26, 1974, 28254/74**

**Int. Cl.² F16H** *7/12, 7/10*

**U.S. Cl. 74—242.1 FP** **4 Claims**

**1.** Compact damper apparatus for applying a tensioning force directly or indirectly to a member such as a drive chain

or belt comprising a first spring influenced plunger movable in a first cylinder which is to contain an hydraulic fluid, the plunger extending from the cylinder to an outer end through which the tensioning force is to be applied to the member, in use of the apparatus, the plunger being hollow and extending from a closed outer end to an open inner end, a first plunger influencing spring which is received in the open inner end of the plunger, an hydraulic fluid chamber, and a restricted passage communicating said hydraulic fluid chamber with said cylinder to provide for flow of hydraulic fluid into and out of said cylinder with movement of said plunger, in use of the apparatus, hydraulic fluid supplied into said cylinder entering the hollow plunger as the plunger applies the required force to the member under the action of the plunger influencing spring, the plunger then moving out of the cylinder, and the



reaction of the member on the plunger being likewise transmitted through the plunger to the spring and deflection of the spring, and resulting movement of the plunger back into the cylinder, causing hydraulic fluid to flow out of the cylinder, the plunger having a hollow interior spring housing part which extends over part only of the plunger length and the inner open end of the plunger opening into said hollow interior spring housing part of the plunger, said plunger further having an air bleed hole which opens from said hollow interior part of the plunger at the highest intended level therein to the outer surface of the plunger, the clearance of the plunger in the cylinder and the position of the bleed hole along the plunger being such that, within the designed stroke of the plunger, there is always sufficient resistance to the passage of air along the cylinder/plunger clearance to prevent air being sucked back therealong and through said bleed hole.

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**3,964,332**

## DRIVER FOR NUTS AND SCREWS

**Albrecht Schnizler, Jr., Nurtingen, Germany, assignor to Metawerke KG Closs, Rauch & Schnizler, Nurtingen, Germany**

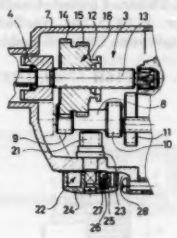
**Filed Jan. 17, 1975, Ser. No. 541,331**

**Claims priority, application Germany, Jan. 17, 1974, 2402099**

**Int. Cl.[2] F16H *3/08***

**U.S. Cl. 74—325** **12 Claims**

1. A power nut and screw driver comprising: a housing; an output shaft rotatably journalled in said housing; a motor; means for transmitting motion from said motor to said output shaft, including a variable gear transmission having at least two selectable gear ratios, said gear transmission comprising a first shaft carrying two pinions and a second shaft extending along said first shaft, and a selector gear shiftable on said second shaft for selectively meshing with one or the other of said two pinions, said selector gear being formed with a circumferential groove; a bifurcated shifting member engaged at one end thereof in said groove; and a handle connected with said member and accessible outside said housing for effecting the axial shifting of said selector gear, said handle having a



toothed portion, and said member having a rack portion which meshes with said toothed portion.

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**3,964,333**

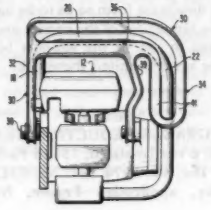
## SAFETY BRAKING MECHANISM FOR A PORTABLE CHAIN SAW

**Sidney Hirschkoff, Los Angeles, Calif., assignor to McCulloch Corporation, Los Angeles, Calif.**

**Filed Oct. 15, 1974, Ser. No. 515,047**

**Int. Cl.[2] B25B *7/12***

**U.S. Cl. 30—381** **14 Claims**



1. In a manually portable chain saw having housing means; manual gripping handle means mounted on said housing means; engine means carried by said housing means; a cutting chain; support bar means projecting forwardly from said housing means for supporting said cutting chain for endless movement; rotation transmitting means for driving said cutting chain; and safety braking means for stopping said cutting chain, said safety braking means comprising:

sensing arm means mounted on said housing means for swinging movement;

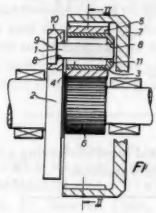
a portion of said sensing arm means being located in front of said gripping handle means during operation of said chain saw and arranged to be swung in a first direction in response to being struck by an arm or hand of an operator;

a flexible brake band including a first end anchored to said housing means and a second end coupled to said sensing arm means for movement therewith such that as said arm means is swung in said first direction, it shifts said brake band into frictional braking relationship with said rotation transmitting means to stop said cutting chain; and

a spring having first and second ends;

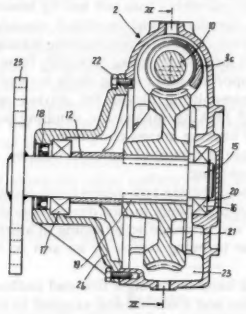
said first spring end being arranged to constantly bias said sensing arm means toward said first direction of movement; and said second spring end being arranged to impose yieldable latching forces on said sensing arm means to resist movement of said sensing arm means in said first direction and thereby prevent premature brake activation.

3,964,334
**GEARS**
Raymond John Hicks, Llanwrthwl near Llandrindod Wells, Wales, assignor to Vickers Limited, London, England
Filed Apr. 3, 1975, Ser. No. 564,754
Claims priority, application United Kingdom, Apr. 18, 1974, 17144/74
Int. Cl.² F16H 57/00, 1/28
U.S. Cl. 74—410 3 Claims



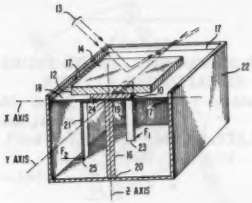
1. A flexible cantilevered, gear wheel support comprising
a. a gear wheel support sleeve;
b. a flexible spindle united at one end to said sleeve by electron beam weld and defining a sleeve zone; and
c. a carrier having at least one recessed base defining a carrier zone and having united to said base opposite said recess by electron beam weld, the other end of said flexible spindle, whereby the zones of the carrier and the sleeve are of diaphram form so as to be capable of flexing relative to the remainder of the carrier and sleeve, flexure of these zones in use of the support being additive to flexure of the spindle united therewith.

3,964,335
**DISENGAGEABLE REDUCTION GEAR UNIT**
Pierre Y. Gérard, 6 rue Donizetti, 75016 Paris, France
Filed Dec. 10, 1974, Ser. No. 531,306
Claims priority, application France, Nov. 21, 1974, 74.38303
Int. Cl.² F16H 1/16
U.S. Cl. 74—425 3 Claims



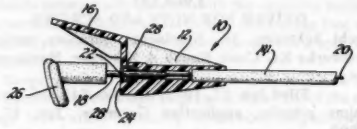
1. A reduction gear unit comprising a driven wheel and a driving element such as a pinion or worm within a gear-box, wherein the driving element is rotatably mounted within the bore of a cage constituted by two coaxial cylindrical end bodies which are capable of rotating within corresponding respective housings formed in the gear-box and rigidly connected to each other by means of a semi-cylindrical cheek, the axis of said bore being eccentric with respect to a periphery of the end bodies and being displaceable with respect to the axis of the end bodies in a direction substantially at right angles to the diametral plane on each side of which the cheek extends so that in a first relative angular position of the cage with respect to the casing the driving element is engaged with the driven wheel and that in an angular position displaced by 180° with respect to the first the driving element is disengaged from the driven wheel and means for immobilizing the cage for each of said positions.

3,964,336
**STEERABLE MOUNT**
Wayne Arthur Harmening, Cherry Hill, N.J., assignor to RCA Corporation, New York, N.Y.
Filed Sept. 3, 1974, Ser. No. 502,673
Int. Cl.² G03B 17/26
U.S. Cl. 74—501 M 6 Claims




1. A mount suspension system comprising:
a housing;
a mount;
a flexible planar diaphragm joined to said mount and said housing for supporting said mount;
a flexible strut having one end joined to said housing and an end opposite said one end joined to said mount for supporting said mount;
a lever having one end joined to said mount, said lever being responsive to a force applied to the lever end opposite said one end for establishing a torque about an axis in the plane of said diaphragm for angularly displacing said mount about said axis.

3,964,337
**MOTION TRANSMITTING REMOTE CONTROL ASSEMBLY**
Lawrence D. Pardington, Rochester, Mich., assignor to Teleflex Incorporated, North Wales, Pa.
Filed Nov. 25, 1974, Ser. No. 526,575
Int. Cl.² F16C 1/10
U.S. Cl. 74—501 P 8 Claims



1. A motion transmitting remote control assembly comprising; guide means having a slideway extending therethrough, said guide means including a hanger body made of organic polymeric material and adapted for attachment to a support structure, said slideway extending completely through said hanger body, a core element movably supported by said guide means for transmitting motion and including a rod slidably disposed in said slideway, at least one bore extending into said hanger body adjacent to and spaced from said slideway and in a direction generally parallel to said slideway and coextensive with only a portion of the length of said slideway to define a

flexible membrane between said slideway and said bore for engaging said rod.

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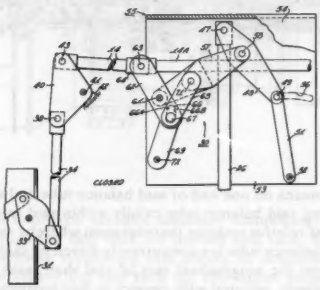
3,964,338

## POLE UNIT MECHANISM FOR CLOSING THE CONTACTS IN AN OIL CIRCUIT BREAKER

John C. Benson, Hyde Park, and George L. Hossfield, Jr., Walpole, both of Mass., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Apr. 10, 1974, Ser. No. 459,846
Int. Cl.² G05G 1/04
U.S. Cl. 74—520 6 Claims



1. In a circuit breaker having stationary contacts and movable contacts movable into and out of engagement with said stationary contacts;

a frame;

a lift rod operably connected to effect the movement of said movable contacts into and out of engagement with said stationary contacts;

linkage mechanism supported by said frame and operatively connected to said lift rod;

a swing link operatively connected to provide for an adjustment in the linkage mechanism so that laterally acting forces are not applied to said lift rod as it is moved in a contact closing operation;

operating means remote from said lift rod to effect the operation of said lift rod;

interconnecting means operatively connecting said operating means with said lift rod;

a force-coupled mechanism comprising a scissor-toggle supported by said frame and operatively connected to said linkage mechanism and to said interconnecting means, said scissor-toggle including a first link and a second link, said links each having first and second ends;

a common pivot pin to which the first ends of said first and second links are pivotally connected;

a first fixed pivot pin carried by said frame to which the second end of said first link is pivotally connected;

a pivot pin carried by said linkage mechanism to which the second end of said second link is pivotally secured;

an adjusting guide means on said frame operably connected to provide limited lateral adjustment in said linkage mechanism and operable to effect the axial movement of said lift rod in a straight line path of travel as it is moved axially; and,

an input lever pivotally supported on said frame and operatively connected to said scissor-toggle and to said interconnecting means;

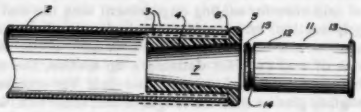
whereby the operation of said operating means is transmitted to said input lever through said interconnecting means and said input lever operates said scissor-toggle to actuate said linkage mechanism to effect a forceful movement of said contacts to a closed or open position.

3,964,339

## END HOLDERS FOR HANDLE BARS

Anthony I. Antonio, Somerville, N.J., and Fernando V. Guerrero, Yardley, Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed May 19, 1975, Ser. No. 578,587
Int. Cl.² B62K 21/26
U.S. Cl. 74—551.9 2 Claims



1. A holder for a tape wound about and fastened at an end of a tubular shaped cylindrical bar for hand guided equipment which comprises:

an expandble hub having a generally cylindrical shaped body of slightly smaller diameter than said tubular bar, a rounded cap section having a brim of sufficient diameter for abutting the end of said tubular bar, and an aperture through said hub and said cap section, said aperture tapering from said cap section to the other end of said hub with the largest dimension at the cap section and its narrowest at the other end; and

a solid cylindrical core having a slightly smaller diameter than said aperture at said cap section but a slightly larger diameter than said aperture at its narrowest dimension, a rounded face section at one end of said core for sealing engagement with said cap section of said hub, and a groove spaced apart from said face section and extending circumferentially about the exterior of said core for defining a lip, the distance between said face section and said lip section on said core being slightly greater than the length of said hub, whereby when said core is inserted into said hub, the face section of said core is in sealing engagement with the cap section of said hub and said lip section is engagement with the other end of said hub.

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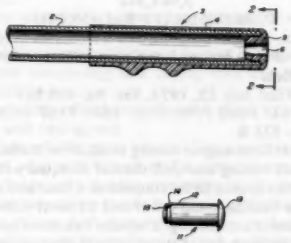
3,964,340

## HAND GRIP HAVING AN INNER HUB

Anthony I. Antonio, Somerville, N.J., and Fernando V. Guerrero, Yardley, Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed May 19, 1975, Ser. No. 578,453
Int. Cl.² B62K 21/26
U.S. Cl. 74—551.9 2 Claims



1. A hand grip for a tubular bar adapted for handguided equipment which comprises:

a tubular grip section having an outer shell slightly larger in diameter than said tubular bar so said bar can be inserted into said tubular grip, and an inner expandable hub having a generally cylindrically shaped body of slightly smaller diameter than said tubular bar and communicating with an end of the grip section for providing a space

between said outer shell and said inner hub to permit insertion of the tubular bar therebetween, said inner hub having a tapered aperture with the largest dimension at the end where said hub communicates with said grip section to its narrowest dimension of its other end; and

a solid generally circular core having a slightly smaller diameter than said tapered aperture at its largest dimension but a slightly larger diameter than said aperture at its narrowest dimension, a rounded face section at one end of said core for sealing engagement with the end of said grip section, and a groove spaced apart from said face section and extending circumferentially about the exterior of said core for defining a lip section, the distance between said face section and said lip section being slightly greater than the length of said inner hub, whereby when said core is inserted into said hub, the face section of said core is in sealing engagement with the end of said grip section and said lip section is in engagement with the other end of said hub.

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**3,964,341**

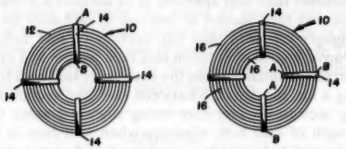
## MULTI-RING FILAMENT ROTOR

**David W. Rabenhorst, Clarksville, Md., assignor to The Johns Hopkins University, Baltimore, Md.**

**Continuation-in-part of Ser. No. 451,923, March 18, 1974, abandoned. This application Feb. 26, 1975, Ser. No. 553,113**

**Int. Cl.² F16C** *15/00*

**U.S. Cl. 74—572** **26 Claims**



1. An inertial energy storage rotor device for rotation about a shaft comprising, in combination,

rim means comprised of a plurality of annular rim elements formed of essentially anisotropic material having substantial tensile strength along longitudinal axes thereof;

rim constraining means for restraining radially outward movement, relative to the shaft, of the rim elements, the rim constraining means being disposed at selected locations of the rim means; and

hub means for carrying the rim means, the hub means being attached to the shaft.

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**3,964,342**

## TURBINE SHAFT BALANCING

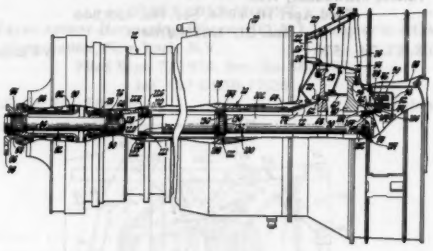
**Paul E. Beam, Jr., Indianapolis, and Charles K. Meyers, Danville, both of Ind., assignors to General Motors Corporation, Detroit, Mich.**

**Filed July 22, 1974, Ser. No. 490,907**

**Int. Cl.² F01D** *3/00*; **F16C** *1/00*; **F16F** *15/22*

**U.S. Cl. 74—573 R** **5 Claims**

1. In a gas turbine engine having multi-drive shafts including an inner shaft having one end thereof directed exteriorly of the front of the engine to be coupled to a load and an aft end covered by a bearing sump cover and an inner exhaust cone, the improvement comprising: a tubular extension on the inner shaft having an open end thereon for providing access into the interior of the tubular extension, a turbine wheel including a hub located inboard of the bearing sump cover, first bearing means for rotatably supporting said hub so as to support one end of said tubular extension for rotation about its longitudinal axis, second bearing means for rotatably supporting the opposite end of said tubular extension for rotation about said longitudinal axis, said first bearing means including an access opening from the aft end of the engine when the inner exhaust cone and bearing sump cover are removed, a balance tube located interiorly of said tubular extension and being removable through said access opening, a plurality of axially spaced index surfaces formed circumferentially around said balance tube, a balance weight mounted on each of said index surfaces including an outer peripheral surface thereon engageable with the inner surface of said tubular extension to locate said balance tube radially inwardly of the inner surface of said tubular extension concentrically of the longitudinal axis thereof and



coacting means on one end of said balance tube and said hub for securing said balance tube axially within said inner shaft and against relative rotation therebetween whereby said inner shaft and balance tube are concurrently driven by said turbine wheel about the longitudinal axis of said shaft, said weights being arcuately adjusted with respect to said balance tube to produce a multi-plane, in-situ balance of the rotating mass of said inner shaft and said turbine wheel coupled in driving relationship therewith.

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**3,964,343**

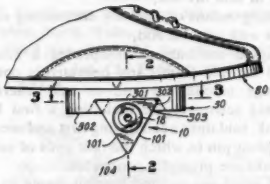
## COMBINATION MEANS FOR RIGIDLY ATTACHING SHOE TO A PEDAL FOR A FOOT-DRIVEN CRANK-OPERATED MACHINE

**James H. Lauterbach, The Carriage House, 90 Gregory Ave., West Orange, N.J. 07052**

**Filed June 9, 1975, Ser. No. 585,187**

**Int. Cl.² G05G** *1/14*; **B62M** *3/08*

**U.S. Cl. 74—594.6** **10 Claims**



1. Combination means for rigidly securing the foot of an operator to a pedal for a foot-driven cycle, or the like, the combination comprising:

a. a pedal having a substantially prismatic configuration, comprising two polygonal end surfaces and at least three substantially mutually congruent side faces extending transversely to and between the end faces;

b. connecting means, at least at one end face of the pedal, for rotatably connecting the pedal to a crank;

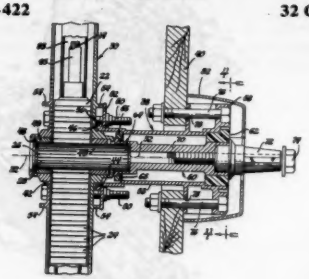
c. pedal connector means adapted to be secured to the sole of a shoe; and

d. shoe connecting means formed on each side face of the pedal, the shoe connecting means being mutually lockably interengageable with the pedal connector means.

## 3,964,344
## ACTUATOR ASSEMBLY

**Louis T. Horvath, Solon, and Clifford H. Allen, Chesterland, both of Ohio, assignors to Teleflex Incorporated, North Wales, Pa.**

**Division of Ser. No. 387,937, Aug. 13, 1973. This application May 2, 1974, Ser. No. 466,385**
**Int. Cl.² F16H 57/02**
**U.S. Cl. 74—422** **32 Claims**



1. An improved actuator assembly comprising; a rack, a pinion engaging said rack for moving said rack, a rack and pinion housing supporting said pinion for rotation about an axis and supporting said rack for movement tangentially of said pinion, said housing extending from said axis in one direction farther than in the opposite direction, mounting means adapted for attachment to a support structure and including a shaft for rotating said pinion, said housing being connectable to said mounting means in spaced planes transverse to said axis and alternatively at either side of said housing so that said shaft may be disposed coaxially with said pinion alternatively from either side of said housing.

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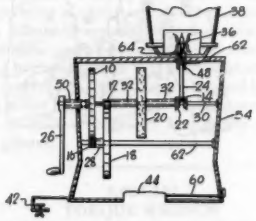
## 3,964,345
## MANUALLY OPERABLE BLENDER

**Jacob J. Le Van, Seattle, Wash., assignor to The Raymond Lee Organization, Inc., a part interest**

**Filed Mar. 10, 1975, Ser. No. 556,785**
**Int. Cl.² F16H 37/06, 1/20; B01F 7/00**
**U.S. Cl. 74—665 P** **5 Claims**



1. A device wherein a manually rotated handle can cause an output shaft to rotate at much higher speed, said device comprising:
- a hollow housing having top and side holes;
- first and second vertically spaced horizontal members disposed in the housing, one end of the first member extending through the side opening;
- a hollow sleeve with said handle secured at one end slidably receiving said one end of the member at its other end, said sleeve being rotatable about the first member;
- a first gear rotatable about the first member;
- coupling means detachably connecting said sleeve to said first gear;
- a second gear rotatable on the second member and coupled to the first gear;
- a third gear rotatable on the second member;
- a first hollow shaft rotatable on the second member and interconnecting the second and third gears;
- a fourth gear freely rotatable on the first member and coupled to the third gear;
- a fifth bevel gear rotatable on the first member;
- a second hollow shaft rotatable on the first member and interconnecting the fourth and fifth gears;
- means supporting said output shaft vertically with its upper end disposed in the top hole; and
- a sixth bevel gear secured to said output shaft and coupled to the fifth gear.

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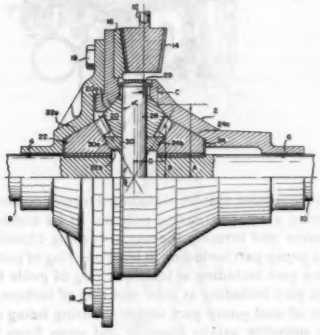
## 3,964,346
## LIMITED SLIP DIFFERENTIAL INCLUDING CONICAL PINION AND SIDE GEARS

**Albert F. Myers, Sr., Warren, Mich., assignor to Aspro, Incorporated, Westport, Conn.**

**Filed Nov. 20, 1974, Ser. No. 525,484**
**Int. Cl.² F16H 1/44**
**U.S. Cl. 74—711** **9 Claims**



1. A limited slip differential assembly for connecting a driving shaft with a pair of driven shafts, comprising
- a. a differential casing containing a chamber, and a pair of aligned bores communicating with said chamber for receiving the adjacent ends of the driven shafts, respectively;
- b. means adapted for connection with said driving shaft for rotating said casing about the axis of said aligned bores;
- c. differential gearing means contained in said casing chamber for connecting said casing with the driven shafts, including
  - 1. a plurality of differential pinion gears rotatable relative to said casing; and
  - 2. a pair of side gears adapted for non-rotatable connection with said driven shafts, respectively, said pinion and side gears having enmeshing teeth; and
- d. torque-responsive means for applying friction torque bias to the driven shafts via said side gears, each of said pinion and side gears having conical back surfaces which converge toward the adjacent wall surface of the casing chamber, said casing chamber wall surface having conical portions which correspond with the conical back surfaces of said pinion and side gears, respectively, the cone angle of the conical back surface of said pinion gears and the corresponding conical portion of the casing chamber wall surface being such that said pinion gears are displaced axially inwardly toward said side gears upon the application of torque to said casing, and wedge means responsive

to the inward movement of said pinion gears for displacing said side gears axially apart into frictional engagement with the corresponding casing chamber conical wall surfaces.

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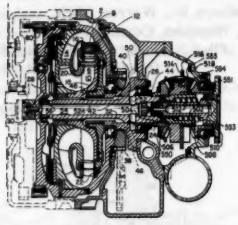
3,964,347

## TORQUE CONVERTER TRANSMISSION HAVING ROTATING CASING, AND RELEASABLE PUMP

Karl Gustav Ahlen, Stockholm, Sweden, assignor to S.R.M. Hydromekanik Aktiebolag, Stockholm-Vallingby, Sweden

Division of Ser. No. 262,514, June 14, 1972, Pat. No. 3,893,551. This application Feb. 14, 1975, Ser. No. 550,144
Claims priority, application United Kingdom, June 25, 1971, 29886/71; Sept. 9, 1971, 42130/71
Int. Cl.[2] F16H *57/10;* F16D *33/02*
U.S. Cl. 74—733 26 Claims



1. A transmission system including a torque converter of the type having a rotating casing adapted to be connected to a drive source and forming therein a working chamber having therein a pump part including at least one ring of pump blades, a reaction part including at least one ring of guide blades and a turbine part including at least one ring of turbine blades, at least one of said pump part and said casing being a movable member movable axially towards and away from the other, such that the pump part and the casing are relatively movable axially between at least a first position in which the pump part is connected to the said casing for rotation therewith and a second position in which the pump part is released from the casing to rotate in relation thereto, a servo-motor means for moving the movable member between said first and second positions, the pump part being the piston of said servo-motor, such that a fluid pressure differential on opposite sides of said pump part effects movement of said movable member between said first and second positions, said turbine part being operatively connected to a turbine shaft, and including a mechanical gear transmission operatively connected to the turbine shaft downstream from the torque converter.

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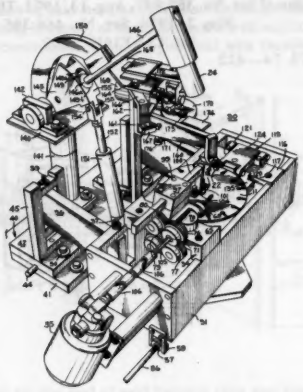
3,964,348

## METHOD AND MACHINE FOR STRAIGHTENING AND TENSIONING SAW BLADES

Chester H. Dawson, Danbury, Conn., assignor to Remington Arms Company, Inc., Bridgeport, Conn.

Filed Mar. 4, 1975, Ser. No. 555,155
Int. Cl.[2] B23D *63/18*
U.S. Cl. 76—26 28 Claims

1. A method of straightening and tensioning a saw blade having a normally-planar surface, comprising the steps of elastically bowing the blade to cause said surface thereof to deflect toward the locus of a segment of the surface of a curved geometric solid having a preselected contour, to which said blade surface would conform if the blade is properly tensioned and straightened; sensing the deflected blade surface in a manner to detect local deviations thereof from said



locus; and hammering the sensed local deviations of said blade surface to conform them to said preselected contour.

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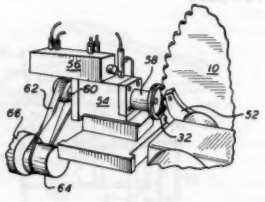
3,964,349

## METHOD AND APPARATUS FOR GRINDING THE TEETH OF A CIRCULAR SAW TO AN IMPROVED CONTOUR

Horst Von Arnauld, and Daniel Joseph Murphy, both of Oakland, N.J., assignors to Von Arnauld Corporation, Franklin Lakes, N.J.

Filed Jan. 13, 1975, Ser. No. 540,449
Int. Cl.[2] B23D *63/14;* B24B *3/40*
U.S. Cl. 76—41 20 Claims




1. An apparatus for automatically grinding the teeth of a circular saw to an improved contour, the apparatus comprising:

a means for holding said circular saw;

a grinding means for grinding a portion of the face of a tooth of a circular saw to a continuous curved contour having a more negative rake angle than the remaining portion of the face of said tooth, said grinding means comprising a cup-shaped grinding wheel having an inner abrasive rim;

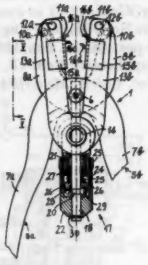
a transport means for bringing said inner abrasive rim and said face of said tooth into grinding contact; and,

a sequencing means for controlling the automatic relative movements of the moving elements of said apparatus.

## 3,964,350
## CABLE STRIPPER

Roberto Casadio, Via Molinelli, 37, Bologna, Italy

Filed Jan. 13, 1975, Ser. No. 540,758
Claims priority, application Italy, Jan. 15, 1974, 3304/74
Int. Cl.² H02G 1/12
U.S. Cl. 81—9.5 A 5 Claims



1. Stripper for stripping a cable with one or more conductor wires coated with an insulation sheath, said stripper comprising a pair of levers articulated about an axis and defining two actuation handles and two jaws approachable towards each other when said handles are actuated against the action of a return spring, a pair of blades fixed on said jaws and cooperating with each other so as to incise the insulation sheath of the cable in diametrically opposite points when the jaws are approached towards each other, two cylindrical sectors having longitudinally knurled outside surfaces, said sectors being articulated on the ends of said jaws about axes parallel to the axis of articulation of the said levers so that the knurled surfaces are arranged opposite to each other, a pair of fork elements each of which consisting of two articulated arms whose extremities are articulated on said sectors at the center of curvature of the knurled surfaces, the arms of the fork elements having a common articulation axis extending between the said handles and parallel to the axis of articulation of said levers, the line which joints the articulation points of the cylindrical sectors on the extremities of the jaws being disposed between the line which joints the articulation points of the said sectors on the extremities of the arms of the fork elements and the axis of articulation of said levers, said stripper being characterized in that it further comprises a tubular element hinged about the axis of articulation of the arms of the fork elements, a bushing associated to said tubular element and defining a cavity, a rod hinged about the axis of articulation of said levers and extending axially through said cavity, an annular groove provided on said rod in the zone of said cavity, a bush slidable on said rod and having a collar, said bush being received in said cavity and biased by return spring means, said collar being formed in such a manner as to retain a plurality of balls arranged in said cavity in engagement within said groove.

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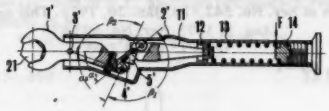
## 3,964,351
## TORQUE WRENCH

Hiroshi Tsuji, Tokyo, Japan, assignor to Tonichi Manufacturing Co., Ltd., Tokyo, Japan

Filed Aug. 6, 1975, Ser. No. 602,230
Claims priority, application Japan, Aug. 7, 1974, 49-94426[U]
Int. Cl.² B25D 23/142, 23/145, 23/147
U.S. Cl. 81—52.4 R 2 Claims

1. A preset type torque wrench comprising that the end of a head, which is engaged with a bolt to be screwed, is connected with a toggle link, the other end of which is so connected with a thruster as to compress a spring, whereby when the torque reaches a preset value, the toggle link is actuated to compress the spring, so that the head turns relatively to a grip part, applied with a manual force, characterized in that another link is arranged in series to said toggle link between



the head and the thruster, so that after the toggle link is actuated, said another link is further actuated, whereby the head continues to turn at a large angle relatively to the grip part.

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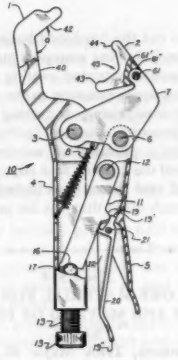
## 3,964,352
## BACK-UP WRENCH FOR THREADED CONNECTORS

Bobby Wayne Dukes, Houston, Tex., assignor to N-S-W Corporation, Houston, Tex.

Continuation-in-part of Ser. No. 456,569, April 1, 1974, abandoned. This application Feb. 7, 1975, Ser. No. 547,842
Int. Cl.² B25B 7/02
U.S. Cl. 81—426 3 Claims



1. A plier-type wrench for gripping an hexagonally-shaped member, comprising:

a first handle,

a first jaw forming integral part with said handle and consisting of a first wall, extending generally in the direction of said handle, and of a second wall extending inwardly and at an angle of approximately 120° from said first wall, said first jaw being adapted to grip one angle of said member;

a plate having a bottom end pivotally mounted on said first handle below said first wall and a top end forming a first external cylindrical bearing surface;

a second jaw having a second external cylindrical bearing surface rotatably mounted on said first bearing surface, said second jaw consisting solely of two spaced-apart lobes at the opposite ends thereof and having a large concavity therebetween such that only said lobes can grip a second angle of said member which is directly opposite to said first angle;

a second handle pivotally mounted on a rearward extension of said plate;

spring means coupled between said plate and said first handle tending to move said jaws apart; and

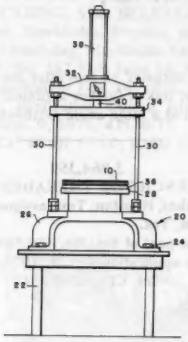
manually-operated means in and between said handles for pivoting said plate toward said first handle, thereby causing said second jaw to forcibly push said member against said first jaw.

3,964,353

## CARPET TILE MACHINE

James E. Fowler, Spartanburg, S.C., assignor to Deering Milliken Research Corporation, Spartanburg, S.C.

Division of Ser. No. 542,110, Jan. 20, 1975. This application Aug. 8, 1975, Ser. No. 603,070
Int. Cl.² B26D 3/08
U.S. Cl. 83—1 9 Claims



1. Apparatus to cut the hardened back surface of a carpet tile in a pressure mold having a support member to receive the carpet tile, a pressure actuated cutting die member and a means to move and apply pressure to the cutting die member, the improvement comprising: a cutting die operably associated with said pressure actuated cutting die member, said cutting die having a plurality of substantially parallel and continuous serrated die cutters, said adjacent die cutters adjacent the edges of said pressure actuated die member being spaced closer to each other than the die cutters interior of said edges.

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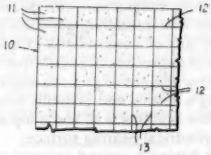
3,964,354

## FLEXILE CORE MATERIAL FOR LAMINATED STRUCTURES AND METHOD OF PRODUCING THE SAME

Thomas J. Johannsen, 216A Major St., Toronto, Ontario, Canada

Division of Ser. No. 338,538, March 6, 1973, Pat. No. 3,867,238. This application Jan. 16, 1975, Ser. No. 541,460
Int. Cl.² B26D 3/08
U.S. Cl. 83—39 2 Claims



1. A method of producing a flexile core material for laminated structures which comprises:

providing a sheet of rigid elastic foam plastic material having a pair of opposite sides,

slotting the sheet from one side thereof to form a plurality of linearly extending, intersecting, slots, said slots dividing the sheet into an array of block-like elements,

each slot being formed by piercing the sheet from said one side using a cutting blade providing a row of wedge-shaped cutting projections, and to a depth such that the slot is continuous on said one side of the sheet and is interrupted at intervals on the opposite side of the sheet, the interruptions defining hinge connections on said opposite side of the sheet by which the block-like elements are articulately interconnected.

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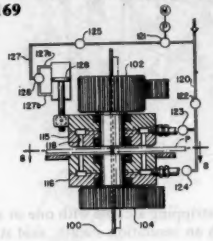
3,964,355

## AIR CUSHION SHEET SUPPORT

Dennis Daniels, Bellevue, Wash., assignor to U.S. Amada, Ltd., City of Industry, Calif.

Division of Ser. No. 386,064, Aug. 6, 1973, which is a continuation-in-part of Ser. No. 359,983, May 14, 1973, abandoned. This application Feb. 18, 1975, Ser. No. 550,438
Int. Cl.² B23D 53/04, 59/00
U.S. Cl. 83—169 6 Claims



6. The apparatus of claim 1, said self-compensating means including means for initially positively moving one of said air cushion means away from the other air cushion means to position a workpiece between the air cushion means.

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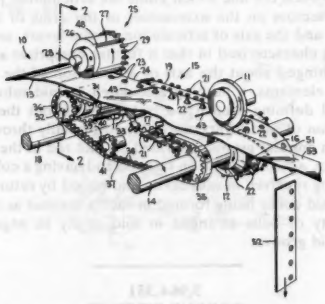
3,964,356

## PAPER WEB TRIMMING APPARATUS HAVING FEED BAND CHOPPER

John Joseph Dineen, Durham, N.H., assignor to Moore Business Forms, Inc., Niagara Falls, N.Y.

Filed Dec. 16, 1974, Ser. No. 533,744
Int. Cl.² B26D 9/00
U.S. Cl. 83—302 5 Claims



1. In an apparatus for trimming a band of marginal feed holes from the marginal edge of a continuous paper web, comprising a pair of rotary slitters disposed for slitting the web parallel to its marginal edge, a web feed device having tractor pins for engaging the feed holes to transfer the web toward said rotary slitters, the apparatus including web chopping means located upstream of said feed device, said means having a chopper blade for repeatedly chopping the web from its marginal edge inwardly of the feed holes, and said blade having an inner end in alignment with said slitters, whereby the web is chopped along its marginal edge during the feeding thereof into said slitters which serve to thereafter slit along the

web thereby separating the feed hole band from the web into short strips.

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3,964,357

**DRIVE MECHANISM FOR A RECIPROCATING FEED**

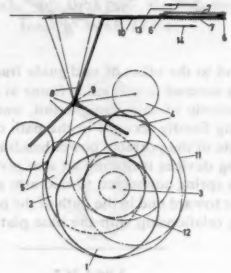
**Helmut Fetzer, Goeppingen; Hans Braun, Weilheim-Teck; Günter Cieslok, and Otto Rasenberger, both of Goeppingen, all of Germany, assignors to L. Schuler GmbH, Germany**

**Filed Jan. 31, 1975, Ser. No. 546,011**

**Claims priority, application Germany, Feb. 2, 1974, 2405123**

**Int. Cl.² B23D *25/02***

**U.S. Cl. 83—318** **12 Claims**



1. Driving apparatus for imparting movement to a component such as a flying shear or the like, comprising:

a rotatably drivable axle

a first control disk carried by and rotatable with said axle, said first disk having a first cam surface thereon,

a second control disk carried by and rotatable with said axle, said second dish having a second cam surface thereon,

a lever having first, second and third lever arms extending from a common lever pivot axis in respective different directions,

pivot means pivotally supporting said lever at the lever pivot axis,

said first and second lever arms extending at different angles from said lever pivot axis and including respective cam followers engageable with the respective first and second cam surfaces, said first and second cam surfaces including means for imparting a predetermined pivotal movement of said lever upon rotation of said axle,

linkage means interconnecting said third lever arm with a component, said lever including means for imparting movement to said component upon pivotal movement of said lever,

and component guide means for guiding the movement of said component in a feeding direction and a substantially opposite return stroke direction,

wherein said first and second cam surfaces include means for imparting sequential movement to said component during rotation of said axle, in said feeding direction with a first feed segment of increasing velocity, a second feed segment of constant velocity, and a third feed segment of decreasing velocity, and in said return stroke direction with a first return segment of increasing velocity, and a second return segment of decreasing velocity, without the interposition of a constant velocity return segment similar to said second feed segment between said first and second return segments.

3,964,358

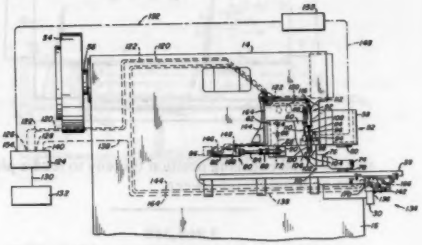
**PUNCHING APPARATUS WITH MECHANICALLY MOVABLE TOOL SUPPORT ARM**

**Rocco L. Stefano, East Amherest, and Robert J. Galland, Cheektowago, both of N.Y., assignors to Unipunch Products, Inc., Buffalo, N.Y.**

**Filed May 7, 1975, Ser. No. 575,376**

**Int. Cl.² B26D *7/26***

**U.S. Cl. 83—400** **12 Claims**



1. A punching apparatus comprising,

a press frame having an upper portion and a lower portion forming a longitudinal recess therebetween for receiving a workpiece supported by said lower portion,

a tool support arm having a front end portion and a rear end portion, said rear end portion connected to said press frame upper portion for pivotal movement about a vertical axis thereon,

a tool holder releasably secured to said tool support arm front end portion,

actuator means for laterally pivoting said tool support arm about said vertical axis to said press frame upper portion between a tool punching position and a tool changing position to permit replacement of said tool holder and tools in said tool holder,

said actuator means pivotally connected to said press frame upper portion and said tool support arm rear end portion, and

valve means for controlling said actuator means to laterally pivot said tool support arm between said tool punching position and said tool changing position.

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3,964,359

**APPARATUS FOR CUTTING SHEET MATERIAL**

**Dwight G. Westover, Sierra Madre, Calif., assignor to Bell & Howell Company, Chicago, Ill.**

**Filed Oct. 24, 1974, Ser. No. 517,553**

**Int. Cl.² B26D *1/28***

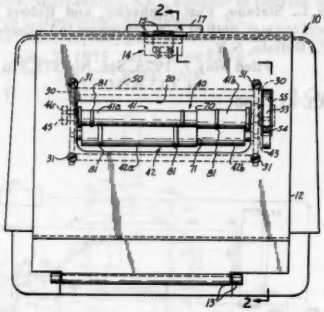
**U.S. Cl. 83—430** **49 Claims**

1. Apparatus for cutting sheet material, comprising:

roller means including first and second rollers, each of said rollers being formed by at least two side by side longitudinally aligned concentric cylindrical portions having relatively larger and smaller diameters whereby on each of said rollers the end edge of said larger cylindrical portion adjacent said smaller cylindrical portion defines a circular cutting edge;

means for positioning said rollers in a cooperating substantially parallel disposed relationship with respect to each other with said defined circular cutting edges overlapping and positioned adjacent each other whereby a piece of sheet material fed between said rollers is engaged thereby and slit into separate parts by the rotating action of said cutting edges; and

motor means responsive to the positioning of said rollers for driving said rollers whenever said rollers are positioned in



said material engaging position thereby to feed a piece of sheet material therebetween.

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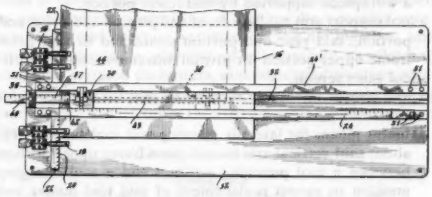
**3,964,360**

## SHEET MATERIAL CUTTING APPARATUS

**Joseph Schwartz, 841A Heritage Village, Southbury, Conn. 06488**

**Filed Dec. 22, 1975, Ser. No. 643,248**
**Int. Cl.² B26D** *3/02, 5/10*
**U.S. Cl. 83—464** **17 Claims**



1. A mat cutting apparatus comprising

a cutting board to support a mat to be cut on a surface of the board, said cutting board being provided with a pair of parallel longitudinal guide bars affixed to and spaced above the cutting board to enable a mat to fit between the guide bars and said cutting board surface, said parallel guide bars being selectively laterally spaced from each other to form lateral guide surfaces for a mat cutting block adapted to snugly fit between the guide bars for longitudinal movement along the guide bars, and cutting board further having a groove parallel to and located between the guide bars to receive a knife edge protruding from the mat cutting block; and

a mat cutting block formed with a guide block and a knife assembly movably mounted to the guide block for movement from a retracted position to a mat cutting position, said guide block being formed with a cutter base having a flat surface for planar movement across a mat to be cut and being sized to snugly fit and slide between the guide bars.

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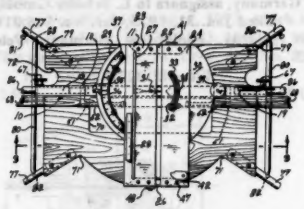
**3,964,361**

## MITER TABLE ASSEMBLY

**Joseph Paul Allaire, 228 NE. 22nd Ave. Apt. 4, Pompano Beach, Fla. 33062**

**Filed July 30, 1975, Ser. No. 600,291**
**Int. Cl.² B27B** *9/04*
**U.S. Cl. 83—471.3** **10 Claims**

1. A miter table assembly for a portable power-operated saw comprising a table top, an elongated base secured over said table top and having a channel extending transversely through said base and also opening upwardly thereof, a guide frame supported on top of said elongated base, pivotably relative thereto about an upright pivot axis, defining a straight slot upwardly registering with said channel, and adapted to support and guide a portable power handsaw with the blade of the latter in downward projection into said slot and said transverse channel, for operative guided displacement of the saw



from one end to the other of said guide frame, a pair of stopping devices secured to said guide frame at relatively opposite ends respectively of said straight slot, one of said stopping devices being fixedly secured in the path of displacement of the base plate of the portable power handsaw and the other of said stopping devices including an arm pivoted to said guide frame and a spring connected to said arm and pivotably biasing the latter toward and in the path of the power handsaw and in overlying relationship with the base plate of the latter.

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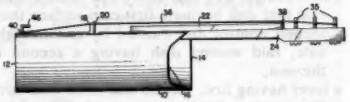
**3,964,362**

## VIOLIN CONSTRUCTION

**William J. Quemore, Sr., 149 E. Church St., Blackwood, N.J. 08012**

**Filed Jan. 3, 1975, Ser. No. 538,362**
**Int. Cl.² G10D** *1/02*
**U.S. Cl. 84—173** **9 Claims**



1. In a violin having a hollow resounding body, a bridge, string attaching means, a neck, a fingering board, the improvement therein of:

said resounding body including a hollow cylindrical tube of sheet material with said neck and fingering board attached to said tube longitudinally and extending from one end of said tube, and said string attaching means including means for stretching the strings between the extended end of said neck and the other end of said tube, and a bridge positioned between the ends of said tube and resting on the inside curved surface for support thereby and for supporting said strings.

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**3,964,363**

## HIGH NOTE INTENSIFIER FOR BRASS MUSICAL INSTRUMENTS

**Anthony F. Armento, 505 Cassingham Road, Fairless Hills, Pa. 19030**

**Filed June 30, 1975, Ser. No. 591,525**
**Int. Cl.² G10D** *9/02*
**U.S. Cl. 84—399** **4 Claims**

1. An intensifier for insertion loosely within the mouthpiece of a brass musical instrument and within an instrument tube carrying the mouthpiece which comprises

an elongated wire having a central portion and one end

thereof angularly disposed with respect to the central portion for insertion in the mouthpiece,

said wire having an enlarged tongue thereon at the other end and freely oscillatable within the instrument tube.

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**3,964,364**

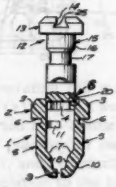
## INITIALLY SINGLE PIECE ROTATABLE FASTENER

**L. Richard Poe, Placentia, Calif., assignor to Hartwell Corporation, Placentia, Calif.**

**Filed Apr. 17, 1975, Ser. No. 568,909**

**Int. Cl.² F16B *13/04***

**U.S. Cl. 85—72** **14 Claims**



1. A fastener for detachably securing a pair of members having mating perforations shaped to receive the fastener, said fastener comprising:

a. a grommet including a head having an opening therethrough and a pair of spreadable essentially parallel stems extending axially from opposite sides of the opening for insertion through the mating perforations;

b. and a stud including a head and a shank, the shank being insertable through the grommet head opening and between the stems;

c. The sides of the shank and grommet stems having mutually engageable means operable, on relative turning movement of the stud and grommet, to spread the stems apart for interlocking engagement with the margins of the mating perforations in the members;

d. a pair of laterally offset yieldable fingers extending inwardly from the stems along respectively opposite sides of a shank therebetween;

e. and restraining means on said shank engageable by the fingers to prevent retraction of the stud from the grommet once the stud has been inserted therein.

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**3,964,365**

## DEVICE FOR UTILIZING PART OF THE RECOIL ENERGY OF A WEAPON

**Erich Zielinski, Grulten, Germany, assignor to Rheinmetall G.m.b.H., Dusseldorf, Germany**

**Filed July 8, 1974, Ser. No. 486,514**

**Claims priority, application Germany, July 13, 1973, 2335649**

**Int. Cl.² F41F *19/02***

**U.S. Cl. 89—43 R** **8 Claims**

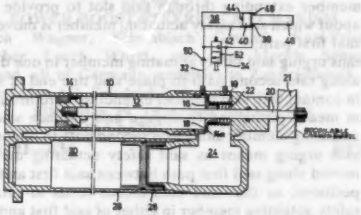
1. A weapon comprising:

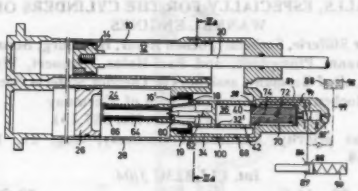
a recoilable barrel;

a hydraulic cylinder having a main piston connected to said barrel:

a primary accumulator containing a compressed gas and connected to said cylinder for displacement by hydraulic fluid forced from said cylinder into said accumulator by said piston upon movement of said barrel, the gas in said primary accumulator storing recoil energy of the barrel in the form of gas pressure and enabling retrieval of recoil energy;

an auxiliary energy accumulator having an auxiliary piston exposed to a pressure difference during retrieval of energy from said primary accumulator, said auxiliary piston having small and large effective surfaces, said pressure difference displacing said auxiliary piston in the direction of said large surface, said auxiliary accumulator being formed with first and second chambers on opposite sides of said auxiliary piston;





means connected to said hydraulic cylinder for transmission of fluid pressure in said hydraulic cylinder to said chambers during a firing position of said barrel, said auxiliary accumulator being formed as an auxiliary cylinder having a third chamber; and

an actuating cylinder connected to said third chamber, said third chamber acting selectively as a pumping-pressure and vacuum chamber of said actuating cylinder.

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**3,964,366**

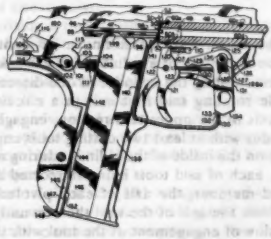
## SAFETY MECHANISM FOR A FIREARM

**Maxwell G. Atchisson, 55 Old Yellow Springs Road, Apt. H, Fairborn, Ohio 45324**

**Division of Ser. No. 250,006, May 3, 1972, Pat. No. 3,850,076. This application Oct. 29, 1974, Ser. No. 518,348**

**Int. Cl.² F41D *11/02***

**U.S. Cl. 89—148** **6 Claims**



1. Safety mechanism for a firearm including a firing mechanism, comprising:

a safety actuating member;

means mounting said safety actuating member for selective movement along a first path and for concurrent movement along a second path, said first path movement being between a first position which prevents firing operation of the firing mechanism and a second position which permits such firing operation;

said mounting means comprising a slot formed in said safety actuating member, said slot being elongated in the direction of said second path;

a member extending through said slot to provide a pivot about which said safety actuating member is moved along said first path;

means urging said safety actuating member in one direction along said second path to place said one end of said slot in contact with said member extending therethrough; and

cam means positioned to engage and displace said safety actuating member along said second path in opposition to said urging means as said safety actuating member is moved along said first path between said first and second positions, so that said cam means tends to retain said safety actuating member in either of said first and second positions along said first path.

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**3,964,367**

## DEVICE FOR MACHINING TROCHOIDAL INNER WALLS, ESPECIALLY FOR THE CYLINDERS OF WANKEL ENGINES

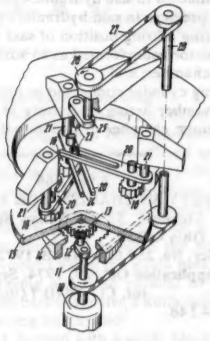
**Theodor Stöferle, Seeheim; Jochen Klaar, Hamburg; Bernhard Bellmann, Pfungstadt, and Paul-Heinz Theimert, Weiterstadt, all of Germany, assignors to Theodor Stoferle, Seeheim and Jochen Klaar, Hamburg, both of, Germany**

**Filed Aug. 9, 1973, Ser. No. 387,131**

**Claims priority, application Germany, Aug. 11, 1972, 2239568**

**Int. Cl.² B23C *3/04***

**U.S. Cl. 90—11 C** **20 Claims**



**10.** The method of machining a substantially trochoidal surface on the inside of a cylinder for a Wankel engine which comprises: rotating the cylinder in one direction about a first axis while rotating said first axis in a circular path about a second axis in the opposite direction, engaging the inside of the cylinder with at least two cutting tools engaging at spaced positions on the inside of the cylinder during movement of the cylinder, each of said tools being supported about an axis on a pivoted member, the axis of each pivoted member being spaced from the axis of the tool thereon and coinciding with the position of engagement of the tool with the cylinder, and pivoting the tools simultaneously about the respective axes of said pivoted members in a manner to maintain a substantially constant angular relation between a first plane containing the axis of each respective tool and the position of engagement of the tool with the cylinder and a second plane tangent to the surface being machined at said position of engagement.

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**3,964,368**

## AUTOMATIC PISTOL

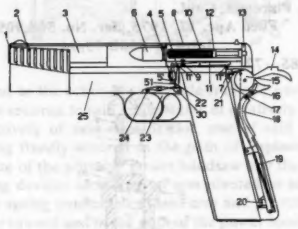
**Jorge Antonio Zimeri Safie, 13 Avenida 14/26 Zona 10, Guatemala City, Guatemala**

**Filed June 18, 1974, Ser. No. 480,594**

**Claims priority, application Italy, Oct. 24, 1973, 30488/73**

**Int. Cl.² F41D *11/02, 11/20***

**U.S. Cl. 89—141** **6 Claims**



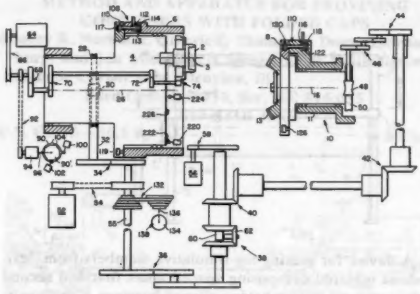
**1.** An automatic pistol having repeat and burst firing modes of operation comprising:

a pistol frame, a barrel carried by said frame, a slide carried by said frame for reciprocating movement between a pistol firing position and a recoil position, means for firing said pistol including a striker pin carried by said slide, a hammer and a sear carried by said frame, said sear being mounted for movement between a first position normally engaged with said hammer to prevent said hammer from striking said pin and a second position disengaged from said hammer for release thereof to enable said hammer to strike said pin, a trigger carried by said frame, a disconnector carried by said slide for reciprocating movement therewith and for movement between first and second positions, said disconnector in said second position being engageable with said sear enabling said sear to move into its second position thereby to release said hammer for firing said pistol, means carried by said trigger and responsive to a pull on said trigger to move said disconnector from said first position into said second position thereby enabling the pistol to be fired and, in response, said slide to be reciprocated from said firing position to said recoil position and back, said sear being movable into its first position upon movement of said slide from said firing position to again engage said hammer and prevent it from striking said pin for a second shot, means biasing said disconnector for movement into said first position, said disconnector lying in its first position under the action of said biasing means when, after firing, said slide returns to its firing position thereby preventing the pistol from firing until the trigger is once again pulled to move said disconnector into its second position, and a manually movable selector member carried by said frame for selecting a repeat firing or burst firing mode of operation for said pistol, said selector member, when moved to said burst firing mode of operation, being cooperable with said moving means for automatically moving said disconnector into said second position upon each return of said slide to its firing position thereby repeatedly moving said sear into its second position, releasing said hammer, and enabling burst firing of said pistol.

## 3,964,369
## LARGE GEAR MANUFACTURE

**Ernst J. Hunkeler, Fairport, N.Y., assignor to The Gleason Works, Rochester, N.Y.**

**Filed Oct. 6, 1975, Ser. No. 619,885**
**Int. Cl.² B23F *9/10***
**U.S. Cl. 90—5** **13 Claims**



**1.** In the known generating roll method for producing a bevel or hypoid gear by (a) cutting a workpiece with a rotating face-mill cutter supported by a cradle oscillating in a cradle housing and having a plurality of radially disposed blades spaced from each other, and (b) rotating the workpiece in a work-holder in timed relation to the oscillation of the cradle during the generation of each gear tooth slot, the improvement comprising the steps of:

spacing the cutter blades so that there can be intervals during tooth slot generation when no blade is in cutting engagement with the workpiece,

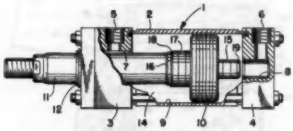
interrupting the generating roll and clamping the work-holder and cradle to prevent, respectively, rotation and oscillation thereof whenever a blade is in cutting engagement with the workpiece, and

continuing said generating roll by incrementally rotating the workpiece and oscillating the cradle only when no blade is in cutting engagement with the workpiece.

## 3,964,370
## CUSHIONING MEANS FOR HYDRAULIC CYLINDER

**Beldon R. Rich, Northbrook, Ill., assignor to Parker-Hannifin Corporation, Cleveland, Ohio**

**Filed July 15, 1974, Ser. No. 488,715**
**Int. Cl.² F15B *15/22***
**U.S. Cl. 91—395** **2 Claims**

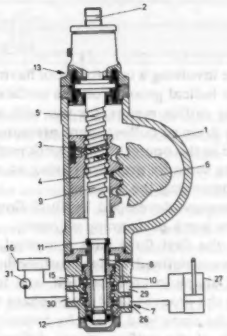


**1.** Cushioning means for cushioning the terminal portion of the stroke of a piston in a hydraulic cylinder wherein said cylinder has a cylindrical bore in one end through which fluid is displaced from said cylinder during movement of the piston therein; said cushioning means comprising a cylindrical member on said piston extending axially therefrom to enter said bore to throttle the flow of fluid through said bore during the terminal portion of said stroke; said member having a series of first, second, and third coaxial cylindrical steps which define with said bore successive first, second, and third annular orifices of stepwise progressively decreasing cross-section area as said piston moves in the terminal portion of its stroke; said first and second orifices being of approximately equal axial length which is substantially greater than the axial length of said third orifice at the end of the stroke of said piston, and said second orifice being of radial width several times that of said third orifice and about one-half that of said first orifice to effect a substantially constant pressure drop across the respective annular orifices thus to decrease the piston velocity at substantially uniform rate and constant deceleration.

## 3,964,371
## POWER BOOST STEERING MECHANISM

**Heinrich Wagner, Schwabisch Gmund; Karl-Friedrich Karcher, Lorch, Wurtt., and Otto Merkle, Schwabish Gmund, all of Germany, assignors to Zahnradfabrik Friedrichshafen AG, Friedrichshafen, Germany**

**Filed May 29, 1975, Ser. No. 581,979**
**Int. Cl.² B62D *5/08*; F15B *13/14***
**U.S. Cl. 91—434** **8 Claims**



**1.** Booster steering apparatus comprising:

a housing (**1**) having a reciprocal sleeve valve (**10**) therein wherein said housing and sleeve valve have coacting flow control elements for selectively effecting passage of pressure and exhaust flow to actuate a servomotor;

said housing having pressure inlet connection means (**30**) and exhaust outlet connection means (**15**) and a connection means (**26, 28**) for each chamber of a double acting servomotor;

a steering spindle (**5**) in said housing having an end (**8**) within said sleeve valve;

means comprising a thrust bearing (**11, 12**) engaged with each end of said sleeve valve to axially secure said end of said steering spindle therein wherein a first reaction piston (**R**) comprised of the terminal end of said steering spindle and the respective end of said valve sleeve is effected to receive road reaction pressure;

closure means (**K**) for the end of said housing to effect a first reaction chamber (**18**) in which said first reaction piston is disposed;

a second reaction chamber (**19**) comprised of an enlarged space (**23**) in said housing surrounding said sleeve valve;

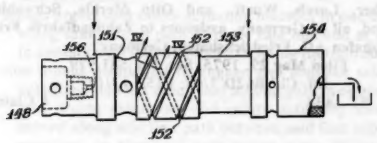
a second reaction piston (**20**) comprising a shoulder on said sleeve valve slidably engaged within said second reaction chamber;

said reaction chambers having connection to respective servomotor connection means (**26, 29**).

## 3,964,372
## CLUTCH CYLINDER CIRCUIT AND CHARGING VALVE THEREFOR

Probir K. Chatterjea, Des Plaines, Ill., assignor to International Harvester Company, Chicago, Ill.

Division of Ser. No. 347,096, April 2, 1973. This application June 6, 1974, Ser. No. 477,128
Int. Cl.² F15B 11/08, 13/042
U.S. Cl. 91—471 1 Claim




1. Procedure involving a control spool having a double helix defined by two helical grooves on the surface of the spool so as to form long orifice means, for use with a source of fluid pressure and a drain to collect spent pressure fluid, for utilizing modulation in the operation of a work performing element so as to actuate same by pressure having an essentially linear rate of rise, comprising the steps of:

directing pressure developed by fluid flow in a first fluid path to the work performing element;

inserting in the first fluid path a control spool with long orifice means defined by two surface helical grooves of general V-shape in cross section, and forming a double helix with the grooves 180° out of phase with one another and with the same lead angle, by connecting a portion of the length of the orifice means defined by the double helix in the first path for restricting rate of rise of pressure to the work performing element to limit the rate of actuating same;

directing flow in a second fluid path from the remaining portion of the length of the orifice means defined by the double helix to drain;

said procedure further characterized by tapping pressure from a pressure tap point communicatively intersecting the orifice means, said tap point to the orifice means defined by the double helix defining the junction between the first and second paths and locatable with respect to the one end of the length of the orifice means defined by the double helix connected to drain, the characteristic of said location of the pressure tap point from said one end being such that the tap point at any given distance along the length of the orifice means defined by the double helix yields a tapped off pressure the magnitude of which is formed as a substantially linear function of the distance;

connecting the tap point to the work performing element;

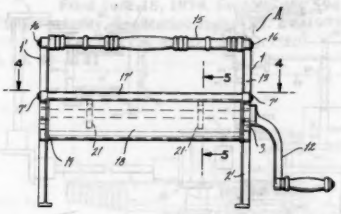
causing relative movement at a constant rate of the pressure tap point with respect to the tapped orifice means defined by the double helix so that said one end of the latter and said point separate at a constant rate, insuring that the tapped off pressure to the work performing element has a rapid, essentially linear rate of rise, said work performing element comprising a fluid motor; and

restricting the second fluid path into drain to yield an initially tapped off motor pressure of approximately 30 psi, the transition due to said rapid, essentially linear rate of raising motor pressure being from the 30 psi to approximately 250 psi final motor pressure and occurring within about one-half second.

## 3,964,373
## PAPER LOG ROLLER

Louis J. Christen, Jr., and John J. Latal, both of St. Louis, Mo., assignors to Christen Incorporated, St. Louis, Mo.

Filed Mar. 19, 1975, Ser. No. 559,753
Int. Cl.² B31C 1/00
U.S. Cl. 93—1 C 6 Claims

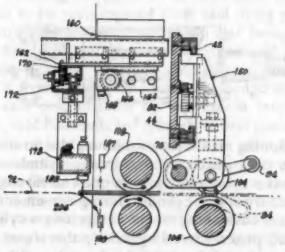



1. A device for making log-simulative members from flexible sheet material comprising spaced apart first and second end frames, said frames having aligned bearings, a shaft journaled in said end frame bearings for rotation therein and extending between said end frames, means for effecting rotation of said shaft, means for detachably engaging an end portion of the flexible sheet material to said shaft whereby upon rotation of said shaft said sheet material will be wound thereabout, a pan-forming member mounted upon said end frames and extending therebetween for disposition beneath said shaft and for cooperating with said end frames to define a volume for receiving the log-simulative member during formation, elongated leaf springs provided within said pan-forming member and having one end affixed to one side portion of said pan-forming member and with their other ends being free and normally disposed adjacent the opposite side portion of said pan-forming member, said leaf springs extending beneath said shaft for bearing against the log-simulative member during formation for urging the material into tightly wound condition about said shaft.

## 3,964,374
## CARTON FOLDING AND GLUEING DEVICE

Walter J. Stolkin, Chicago; William A. Riley, Woodridge, both of Ill., and Henry Sejda, Munster, Ind., assignors to Stolmar Corporation, Chicago, Ill.

Filed Sept. 12, 1974, Ser. No. 505,451
The portion of the term of this patent subsequent to May 20, 1992, has been disclaimed.
Int. Cl.² B31B 1/36, 1/52, 1/62
U.S. Cl. 93—36 MM 24 Claims




1. In an apparatus for producing a folded carton from a carton blank a folding device comprising:

a. flipper means reciprocating between a raised position and a lowered position engaging the leading edge of said

blank during upward movement for flipping upwardly a portion of said leading edge;

b. means for mounting said flipper means to said apparatus; and

c. means for reciprocating said flipper means between said raised and lowered positions.

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**3,964,375**

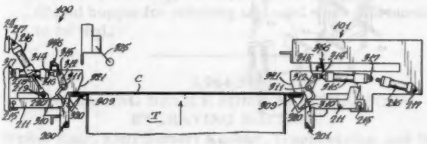
**METHOD AND APPARATUS FOR PROVIDING CONTAINERS WITH FOLDED CAPS**

**Stanley R. Norbutas, Glenview; Thomas B. Domenz, Schaumburg, and Jan Mieleszuk, Chicago, all of Ill., assignors to Signode Corporation, Glenview, Ill.**

**Filed Oct. 18, 1974, Ser. No. 516,035**

**Int. Cl.² B31B *49/02***

**U.S. Cl. 93—36.5 R** **8 Claims**



1. Method of providing and securing a cap to a flanged open end container comprising the steps of selecting a cap corresponding to the size of the container tube, inserting a cap on a cap conveyor and sensing the transverse dimension of the folding area, lifting the cap and conveying the cap over the open end of the container, which cap includes an outer peripheral portion extending outwardly of the container flange, folding the peripheral portion of the cap extending outwardly of the container flange, elevating the container into position under the cap wherein the container flange is disposed within the peripheral portion of said cap, folding the cap flange to encompass the container flange to form a flange assembly, folding said cap and container flange assembly into parallel relationship with the sidewalls of said container and securing a ligature about the cap and container flange assembly to affix the cap to the container.

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**3,964,376**

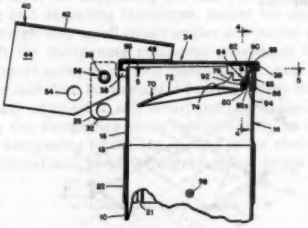
**TAMPER-PROOF WEATHER COVER DEVICE FOR EXHAUST PIPES**

**William R. Janke, Rte. No. 3, Northfield, Minn. 55057**

**Filed Dec. 11, 1974, Ser. No. 531,758**

**Int. Cl.² F23L *17/02***

**U.S. Cl. 98—59** **25 Claims**



6. A tamper-proof weather cover device comprising a lid member of a size larger than the upper end of a substantially vertical exhuast pipe so that said lid member can overlie and close the upper end of said pipe, means for pivotally attaching one edge portion of said lid member adjacent said upper pipe end at a location outside said pipe end so that the peripheral edge of said lid member extends laterally beyond said pipe end, a vane member of a smaller size than said pipe end so as to fit within said pipe end, means pivotally attaching one edge portion of said vane member to the underside of said lid member at a location spaced inwardly from said peripheral edge so that said vane member resides within said pipe end and extends in a cantilever manner beneath said lid member, and latch means within said pipe end operable by said vane member to latch said lid member closed when there is no exhaust gas flow and said vane member is permitted to pivot downwardly due to gravity, and to unlatch said lid member when there is a sufficient exhaust gas flow to pivot said vane member upwardly to permit said lid member to open.

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**3,964,377**

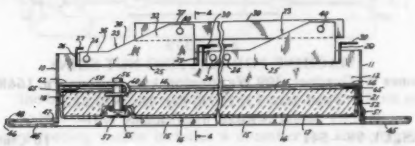
**INSULATED CLOSURES FOR ATTIC FANS, AND SEALS THEREFOR**

**Lael Ogden Chapman, P.O. Box 13524, Houston, Tex. 77019**

**Filed Nov. 22, 1974, Ser. No. 526,123**

**Int. Cl.² F04D *25/08*, *25/14***

**U.S. Cl. 98—116** **11 Claims**



1. Insulated closure for an attic fan air inlet, comprising an attic fan having an air inlet, said attic fan having plural parallel elongate vanes across said air inlet rotatable to open and closed positions with respect to said air inlet, a frame around said air inlet at the entrance to said air inlet, said vanes being spaced from said entrance to said air inlet to provide a recess space over the area of said air inlet, insulated panel means conforming in shape to said air inlet and disposable in a closed position within said recess space of said air inlet and flush with the entrance to said air inlet to cover said vanes and to close said air inlet, said panel means being movable from said closed position covering said vanes to open said air inlet, and peripheral seal means around at least one of said panel means and air inlet to seal therebetween when said panel means is in said closed position.

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**3,964,378**

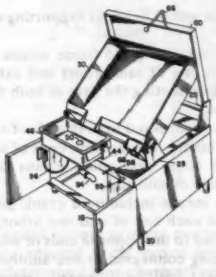
**TILTING FRYPAN WITH DRAIN SYSTEM**

**Robert L. Dunkelman, Shreveport, La., assignor to The Frymaster Corporation, Shreveport, La.**

**Filed Mar. 22, 1974, Ser. No. 453,767**

**Int. Cl.² A47J *37/10***

**U.S. Cl. 99—425** **9 Claims**



1. A tilting frypan apparatus comprising in combination:

a free-standing cabinet having a support frame mounted above said cabinet;

a frypan pivotally mounted on said support frame with brackets spacing said frypan from a pivotal axis extending in front of said frypan and parallel to the front side thereof;

means for tilting said frypan about said axis forward toward the front of said cabinet;

a pouring lip integral with the front rim of said frypan and forming a continuous channel extending forward from the front side of said frypan to a point above said axis to pour out fluid from said frypan;

a drain pan having a fluid outlet in the bottom and removably mounted in front of said frypan to substantially instantaneously receive a substantial surge of said fluid in said frypan as said frypan is tilted, a side of said drain pan adjacent to said frypan disposed between said axis and said front side of said frypan with said pouring lip overlying said drain pan side; and

a swivel drain spout in communication with said fluid outlet to selectively direct the fluid discharged from the drain pan to a storage reservoir or to a floor drain.

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**3,964,379**

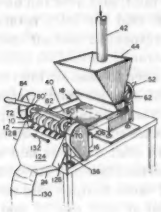
## MACHINE FOR SLITTING NUT SKINS

**James W. Gardner, 309 Washington Ave., Tyrone, Pa. 16686**

**Filed Jan. 13, 1975, Ser. No. 540,512**

**Int. Cl.² B02B** *3/08*; **A23N** *5/01*

**U.S. Cl. 99—541** **10 Claims**



1. A machine for slitting the skins of edible nuts, comprising

a. at least a pair of rolls disposed in a vertical plane one above the other and spaced apart from one another to define a nut receiving gap between their peripheries,

b. slitting means disposed adjacent said gap for engaging nuts passing through said gap,

c. upper and lower parallel arbors rotatably supporting said rolls,

d. frame means including bearings supporting opposite ends of said arbors,

e. parallel guide means on said frame means engaging the ends of at least one of said arbors and extending along parallel paths intersecting the axes of both the upper and lower rolls, and,

f. adjusting means connected to both ends of said one arbor and to said frame for moving both ends of said one arbor simultaneously along said guide means for selectively changing the size of said gap,

g. said adjusting means including a crank pivoted to said frame means at each end of said one arbor, each of said cranks connected to the opposite ends of said one arbor,

h. said cranks being connected to one another for simultaneous movement and lever means connected to said cranks for pivoting said cranks and moving said one arbor along said paths,

i. said lever means including a handle extending outwardly from machine whereby it may be aligned with the handles of other similar machines arranged in a row.

**3,964,380**

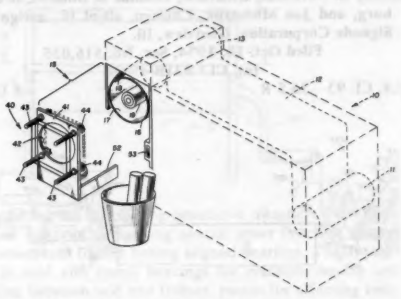
## APPARATUS FOR SECURING A SHEET OF MATERIAL INTO A ROLL

**Charles H. Meyer; Donald H. Sheffield, and George N. Willman, all of Dallas, Tex., assignors to Mobil Oil Corporation, New York, N.Y.**

**Filed May 16, 1975, Ser. No. 578,046**

**Int. Cl.² B65B** *13/02*

**U.S. Cl. 100—9** **6 Claims**



1. A take-up apparatus for handling sheet material as it is fed from a source, said apparatus comprising:

a housing having a chamber therein, said chamber being open at one end;

an opening in said housing adapted to receive the material and direct it into said chamber;

a roller rotatably mounted within said chamber and extending substantially throughout the length of said chamber;

means to rotate said roller;

means for guiding said material onto said roller;

means for ejecting said material from said roller and out said open end of said chamber after said material has been rolled on said roller; and

means for securing said material in its rolled condition as said material is ejected from said roller.

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**3,964,381**

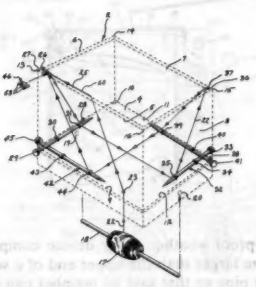
## APPARATUS FOR TYING BUNDLES

**Clayton J. Coenen, 2646 W. Spencer Road, Appleton, Wis. 54911**

**Filed Jan. 15, 1975, Ser. No. 541,191**

**Int. Cl.² B65B** *13/04*, *67/00*

**U.S. Cl. 100—34** **6 Claims**



1. An apparatus for binding bundles, the combination comprising

a hopper for holding a bundle to be bound, having a floor approximately the size of said bundle with two pairs of opposite edges, and having a pair of diagonally opposite

corner structures located adjacent diagonally opposite top corners of said bundle;

a supply of cord mounted on said apparatus for binding said bundle;

releasable cord retainers mounted centrally of each of said edges of said floor and on each of said pair of diagonally opposite corner structures to receive and hold said cord drawn from said supply and strung diagonally from each of said corner structures to said releasable cord retainers mounted centrally of said floor edges on opposite sides of said floor and transversely across said floor;

said cord strung about said releasable cord retainers having a free end fastened to itself to form a completed loop of cord with ends of said loop at said diagonally opposite corner structures;

said releasable cord retainers positively retaining said cord loop and said releasable cord retainers mounted centrally of each of said edges of said floor having means external of said hopper for releasing said cord when said bundle is to be tied.

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**3,964,382**

## ENGRAVING DEVICE FOR A PRINTING FORM ENGRAVING MACHINE

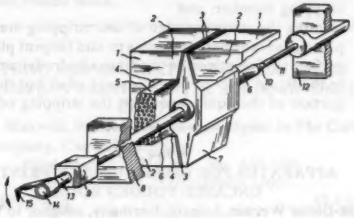
**Walter Baar, Kiel; Herbert Koehler, Trappenkamp, and Walter Muecke, Klausdorf, all of Germany, assignors to Dr. -Ing Rudolf Hell GmbH, Germany**

**Filed July 10, 1974, Ser. No. 487,283**

**Claims priority, application Germany, July 16, 1973, 2336089**

**Int. Cl.² G11B *3/18***

**U.S. Cl. 101—1** **12 Claims**



1. In an engraving device for a machine to engrave printing forms, said device comprising a shaft having an end supporting a lever supporting an engraving needle, bearing means adjacent the lever for supporting the shaft for rotary movement with the end extending therefrom, means for oscillating the shaft through very small rotary angles and means acting upon the shaft for dampening rotational movement thereof, the improvement comprising said dampening means being connected to said shaft between said bearing means and said lever and closely adjacent to said lever, and said dampening means applying the dampening force symmetrically to the shaft so that the dampening forces are applied to the shaft to dampen both torsional and bending forces applied to the end of the shaft.

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**3,964,383**

## RECIPROCATING SELF-CONTAINED MARKING DEVICE

**Patrick Delligatti, c/o Dalemark Industries, Inc., 950 Airport Road, Lakewood Industrial Road, Lakewood, N.J. 08701**

**Filed Sept. 24, 1974, Ser. No. 508,858**

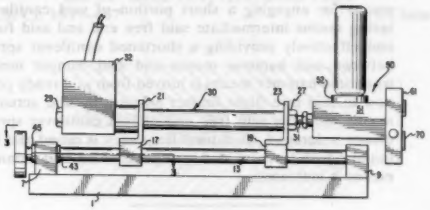
**Int. Cl.² B41F *17/24, 31/24***

**U.S. Cl. 101—44** **4 Claims**

1. A printing device for encoding production data on moving articles comprising a plate-like base, a slide guide means on said base; a slide assembly carried by said slide guide means and movable toward and away from one edge of said base; said slide assembly including a printing head for imprinting moving articles and a motor means connected to said printing head for reciprocating said printing head from a null position into contact with the article and returning said printing head to the null position;

means for independently advancing or retracting said slide assembly along said base in the same path of reciprocation as that of said printing head;

said printing head being of the capillary action-wettable type, including a source of printing ink located adjacent



the back of said type and means for feeding ink from said source to the back of said type for inking thereof;

said feeding means includes a chamber for receiving ink from said ink source, said chamber being filled with a porous capillary action-wettable filler, a port in said chamber leading to the outside of said chamber behind said capillary wettable porous type, a uniformly permeable pad disposed between said port and the back of said porous type and wick means in said port to convey ink from the wettable filler through said port and to said permeable pad, said permeable pad acting to distribute ink uniformly behind the entire type area.

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**3,964,384**

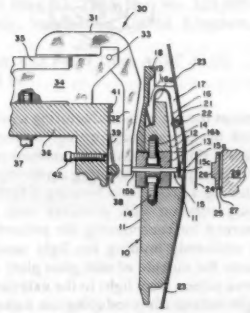
## HIGH SPEED PRINTING MECHANISM

**Ross W. Johnston, Norristown, Pa., assignor to Sperry Rand Corporation, Blue Bell, Pa.**

**Filed Mar. 11, 1974, Ser. No. 450,123**

**Int. Cl.² B41J *9/02***

**U.S. Cl. 101—93.48** **2 Claims**



1. A high-speed impact printing mechanism having a free flight hammer adapted to be moved from a ready position toward a predetermined type character on juxtaposed moving type to a free flight impact position comprising:

hammer mounting means,

bearing means supported on said hammer mounting means,

hammer means slidably mounted in said bearing means opposite said moving type,

impact head means on said hammer means,
guide means on said hammer means,
actuator means adapted to move said hammer means from said ready position toward said moving type and to a free flight impact position when a selected type character is juxtaposed said hammer means,
cantilever spring means mounted at a fixed end on said hammer mounting means and having a free end slidably guided in said guide means, said cantilever spring means being normally spring loaded to return said hammer means and said actuator means to a ready position, and
front damper means mounted on said hammer mounting means for engaging a short portion of said cantilever spring means intermediate said free end and said fixed end effectively providing a shortened cantilever spring between said hammer means and said damper means when said hammer means is moved from said ready position to said free flight impact position by said actuator means, whereby said free end of said cantilever spring means is damped, its natural frequency is raised and the initial return force of said spring means on said hammer means is increased.

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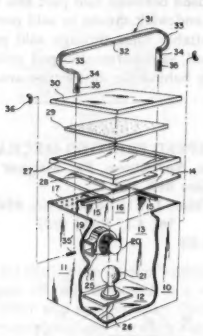
## 3,964,385
## UNITARY DEVICE AND METHOD FOR SCREEN MANUFACTURE AND PRINTING

**Ralph Knight, 3108 McColloch St., Wheeling, W. Va. 26003**

**Filed Apr. 3, 1975, Ser. No. 564,856**
**Int. Cl.² B41C** *1/14;* **B41F** *15/20*
**U.S. Cl. 101—128.4** **12 Claims**

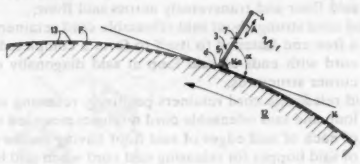


**1.** Apparatus for use in manufacturing a printing screen and printing with the screen, comprising: a generally rectangular box having six sides forming an enclosed interior; said box including means for manufacturing a printing screen, with said means including a glass plate forming a first side of said box for receiving thereon film positives and a light sensitive stretched screen for reproducing the pattern of the positives, means for uniformly holding the light sensitive screen and positives onto the outside of said glass plate and shielding the light sensitive screen from light to the exterior of said box, and electric light means for producing an exposure light within said box that will shine through said glass plate and the positives to the light sensitive screen for exposure; and means for printing with the printing screen, with said means including a vacuum plate forming a second side of said rectangular box and being air permeable throughout the major portion of its extent, blower means for pulling outside environment air through said second side vacuum plate and into the box, and means for mounting the printing screen to overlie the exterior of said vacuum plate with the material to be printed on between said screen and the vacuum plate.

## 3,964,386
## METHOD AND APPARATUS FOR REMOVING SURPLUS INK ON PRINTING CYLINDERS

**Mamiliano Dini, Island of Elba, Italy, assignor to European Rotogravure Association, Munich, Germany**

**Filed Nov. 14, 1973, Ser. No. 415,788**
**Claims priority, application Germany, Dec. 11, 1972, 2257102**
**Int. Cl.² B41F** *35/00;* **A46B** *15/00*
**U.S. Cl. 101—169** **11 Claims**



**1.** In a process wherein a layer of liquid is transferred onto a surface in a surplus amount and all but a predetermined residual portion of the liquid layer is stripped off, a method of stipping off all but the residual portion comprising the steps of:
providing a stripping member having a mass sufficiently low so as to permit rapid oscillation thereof, said stripping member also having a stripping edge adjacent to but at all times spaced from the surface by a predetermined distance,
disposing said stripping edge in a plane generally parallel to a tangent plane of the surface,
causing relative movement between the surface and the stripping member, and
oscillating the stripping edge of said stripping member in a plane generally perpendicular to said tangent plane of the surface sufficiently so as to create a hydrodynamic barrier in the liquid layer to block passage of all but the residual portion of the liquid layer past the stripping edge.

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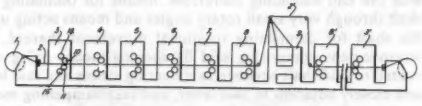
## 3,964,387
## APPARATUS FOR CONTINUOUSLY PRINTING UNCASED FOLDED BOOKS

**Hans-Dieter Werner, Leipzig, Germany, assignor to VEB Polygraph Druckmaschinenwerke Leipiz, Leipzig, Germany**

**Division of Ser. No. 285,521, Aug. 31, 1972, abandoned. This application Dec. 11, 1973, Ser. No. 423,815**
**Int. Cl.² B41F** *5/06, 13/50*
**U.S. Cl. 101—224** **4 Claims**



**1.** Apparatus for continuously printing uncased folded books, comprising a series of printing machines, each printing machine including a printing roller set located along a path and movable between an inoperative position and a printing position; each of said printing roller sets including a pair of printing rollers spaced from each other in said inoperative position, and in contact with opposite sides of said web, respectively, in said printing position so that both sides of each web section are imprinted; transporting means for continuously transporting a length of a paper web along said path so that consecutive web sections cooperate with the printing roller sets of consecutive ones of said printing machines and so that the printing roller set of each of said printing machines makes an imprint on a correlated web section when the respective printing roller set is in said printing position, and

makes no imprint when it is in said inoperative position; control means for operating said printing roller sets of the respective printing machines between said inoperative and printing positions in a predetermined sequence so that each web section of said length is imprinted with a different imprint and only by the correlated printing roller set of one of said printing machines but is not imprinted by the printing roller sets of any of the other machines of said series, said control means including a series of control devices operatively connected with said pairs of printing rollers, respectively, for moving said printing rollers between said inoperative and printing positions so that each printing roller is in said printing position during one revolution, each control device including a pair of shafts supporting said printing rollers of each pair of printing rollers, respectively, a pair of arm means pivotally mounted about an axis spaced from the printing cylinders and supporting said shafts for movement with said printing rollers toward and away from each other, a pair of toggle levers having first inner articulated ends located in the plane of symmetry of said each said pair of printing rollers and outer ends connected with said shafts, respectively, and a pair of spring means each acting on one of said outer ends and on said shafts to move said printing rollers to said printing position, said toggle levers having an aligned straight line position spacing said shafts and printing rollers in said inoperative position, and an angular position in which said spring means move said printing rollers to said printing position, and operating means including a cyclically reciprocable rod connected with said first articulated ends for moving said both toggle levers between said aligned and angular position; and cutting, assembling, and folding means following said series of printing machines in the direction of movement of said web for cutting the imprinted web sections into sheets, and for assembling and folding said sheets to form an uncased folded book.

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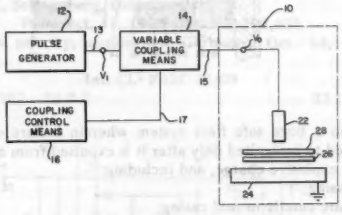
**3,964,388**

## METHOD AND APPARATUS FOR HIGH SPEED NON-IMPACT PRINTING WITH SHADE-OF-GREY CONTROL

**James C. Maxwell, Winchester, Mass., assignor to The Carter's Ink Company, Cambridge, Mass.**

**Filed Mar. 4, 1974, Ser. No. 447,669**
**Int. Cl.² G01D *15/10*; H04N *1/00***
**U.S. Cl. 101—426** **27 Claims**




**22.** A method for non-impact printing comprising the steps of:

A. generating a print signal at a print signal generating means,

B. applying said print signal by way of a variable coupling means to the field shaping electrode of a non-impact printer having a field shaping electrode and a base electrode, a recipient sheet, said recipient sheet being positioned between said field shaping and base electrodes a donor sheet, said donor sheet being positioned between said field shaping and base electrodes and having printing particles dispersed near the surface of said donor sheet adjacent to said recipient sheet,

C. controlling the signal coupling between said signal generating means and the field shaping electrode of said printer, said signal coupling being provided by said variable coupling means so that a substantially amplitude scaled replica of said print signal is applied to said associated field shaping electrode.

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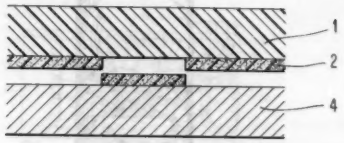
**3,964,389**

## PRINTING PLATE BY LASER TRANSFER

**John O. H. Peterson, Cape Elizabeth, Maine, assignor to Scott Paper Company, Philadelphia, Pa.**

**Filed Jan. 17, 1974, Ser. No. 434,256**
**Int. Cl.² B41C *1/06*, *1/10*; G01D *15/14***
**U.S. Cl. 101—467** **1 Claim**




**1.** The method of making an imaged printing plate comprising the steps of:

providing a transparent substrate having thereon a coating comprising

a. particles which absorb laser energy

b. a self-oxidizing binder and

c. a cros-linking agent or a cross-linking agent in combination with a cross-linkable resin

placing said coating in intimate contact with a lithographic printing surface,

selectively transferring the coating to said lithograhic printing surface by directing laser energy through the film to the surface,

and cross-linking the binder or resin by heating.

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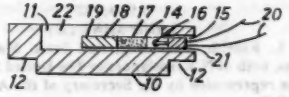
**3,964,390**

## BURSTING DISC ASSEMBLY

**Leslie Ernest Medlock, Alloway, Scotland, assignor to Imperial Chemical Industries Limited, London, England**

**Filed Mar. 13, 1972, Ser. No. 233,899**
**Claims priority, application United Kingdom, Mar. 31, 1971, 8298/71**
**Int. Cl.² F42D *1/00*; A62C *35/02***
**U.S. Cl. 102—1 R** **8 Claims**

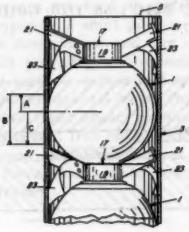



**1.** A bursting disc assembly comprising a bursting disc having a shear line defining a line of minimum thickness around a destructible portion of the disc and charge of detonating explosive positioned sufficiently close to the said destructible disc portion to break the disc around the shear line and destroy the said destructible portion when the charge is exploded, said destructible portion of the bursting disc being made from a material which is selected from the group consisting of nylon, resin laminated glass fiber, resin laminated paper and polytetrafluoroethylene and which is shattered to a powder by the detonation of the explosive charge.

## 3,964,391
## DISPENSER-LAUNCHED MUNITION WITH TWO-STAGE SPIN-IMPARTING VANES

**Alexey T. Zacharin, Parsippany, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Sept. 4, 1973, Ser. No. 394,223**
**Int. Cl.² F42B *13/32***
**U.S. Cl. 102—4** **3 Claims**



1. A munition, adapted to be launched from a tubular dispenser, comprising a hollow body containing a payload and having a spin axis, and means for reacting to the airstream after launch to impart a high spin velocity to said body during a short flight, said means comprising:

a primary vane structure including a diameter of outwardly-extending rigid primary vanes rigidly attached to said body, said primary vanes being helically oriented to said spin axis and capable of imparting a predetermined spin velocity to said body, the diamter of the outer envelope of said primary vanes being no larger than that of said body;

a like plurality of helically-oriented resilient, flexible, secondary vanes each rigidly attached at its inner end to one of said primary vanes and normally extending outwardly a substantial distance therebeyond, to substantially increase the total effective vane area and thereby impart to said body a spin velocity substantially higher than said predetermined spin velocity; said secondary vanes being adapted to be folded inwardly toward said body to permit insertion with said body and said primary vanes into a launch tube and to spring outwardly after launch; and

means for removably attaching said flexible vanes to said rigid vanes in such manner that said flexible vanes will be separated from said rigid vanes by the airstream at a predetermined spin rate.

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## 3,964,392
## LAND MINE (U)

**Irving L. Kintish, Rockaway, and Irwin Marcus, Pompton Plains, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Sept. 1, 1967, Ser. No. 666,235**
**Int. Cl.² F42B *23/16***
**U.S. Cl. 102—8** **10 Claims**

1. A mine for firing fragments in a 360° pattern and at a proper burst height, said mine comprising

a container,

a coiled explosive ribbon seated within said container,

a plurality of fragments affixed to said ribbon,

projecting means mounted in the center of said explosive ribbon and secured to one end thereof,

launching means secured to said projecting means for launching said projecting means vertically in a plane perpendicular to the plane of said coiled explosive ribbon,

a detonator secured to the other end of said explosive ribbon, and

flexible means connected at one end to said detonator and at the other end to said container,

whereupon launching of said projecting means uncoils said explosive ribbon to form a spiral configuration for firing said fragments in said 360° pattern.

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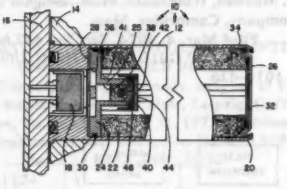
## 3,964,393
## IGNITER

**Kenneth R. Foote, China Lake, Calif.; Joseph W. Hanzel, Grenada, Miss., and Warren P. Froehner, China Lake, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed June 21, 1974, Ser. No. 481,624**
**Int. Cl.² F42B *4/22, 4/26***
**U.S. Cl. 102—37.6** **2 Claims**



1. In a bore safe flare system wherein a flare candle is adapted to be ignited only after it is expulsed from a housing by an explosive charge, and including:

a casing;

a flare candle in said casing;

a piston in said casing rearwardly of said flare candle;

ignition means fastened in the after end of said flare candle and extending into a portion of said piston;

said piston and said ignition means being interfitted such that separation thereof must take place before ignition may be accomplished;

and stop means forming part of the forward end of said casing to stop said piston for separation from said ignition means when said flare system is actuated; the improvement comprising:

said ignition means comprising a cup shaped body having a centrally located flanged post with a pyrotechnic ignition mix consolidated on said post to form a solid cylindrical plug;

said piston having a forwardly extending tube with a central bore; and

said plug closely fitting within the bore of said tube.

3,964,394

## PYROCHEMICAL GAS GENERATOR

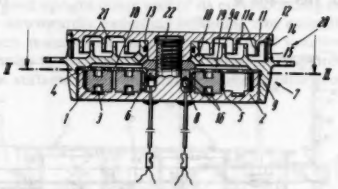
Siegfried Wolf, Taufkirchen, Germany, assignor to Bayern-Chemie Gesellschaft fur Flugchemische Antriebe mit beschrankter Haftung, Germany

Filed Sept. 18, 1974, Ser. No. 507,134

Claims priority, application Germany, Oct. 5, 1973, 2350104

Int. Cl.² F42B 3/04

U.S. Cl. 102—39 8 Claims



1. A pyrochemical gas generator, comprising a cylindrical receptacle having upper and lower parts, said lower part having a bottom interior wall with a plurality of concentric grooves defined therein and also a plurality of cylindrical recesses arranged in spaced relationship around each groove and defining annular charge support ledges above the grooves which extend beyond each side of the associated groove, a plurality of preformed explosive charges each having a predetermined defined burning surface and each being seated on a respective support ledge above the associated grooves with substantially their outer peripheries exposed for burning, said grooves forming communicating gas passages for the combustion gases during burning of said charges, a firing grate having a gas passage therethrough engaged over said lower part and over said charges, and a gas outlet connected to said receptacle upper part above said grate.

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3,964,395

## ELECTRICAL PRIMER FOR PROJECTILES

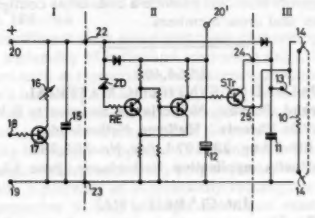
Hans Kaiser, Konigsfeld, and Arthur Kopf, Schramberg-Sulgen, both of Germany, assignors to Gebruder Junghans GmbH, Schramberg, Germany

Filed Oct. 11, 1972, Ser. No. 298,432

Claims priority, application Germany, Oct. 14, 1971, 2151245

Int. Cl.² F42C 11/06

U.S. Cl. 102—70.2 R 22 Claims



1. In an electrical primer for projectiles with an electrical igniting element and with an ignition circuit system having at least one condenser connected to the igniting element through an electronic switch element, the improvement wherein the electronic switch element is an electronic triggering element having control input terminals and a timing element for generating electrical pulses for application to the control input terminals of said tilting element.

3,964,396

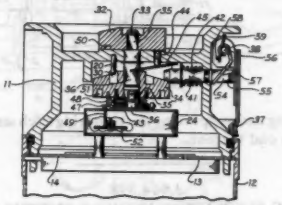
## SPIN ACTUATED RELEASE MECHANISM

Stanley J. Herold, Switz City; Donald E. Lagrange, Washington, and John E. Laswell, Bloomfield, all of Ind., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 19, 1975, Ser. No. 559,959

Int. Cl.² F42B 4/12; F42C 15/22

U.S. Cl. 102—79 4 Claims



1. A release mechanism for use with an aircraft parachute flare comprising,

a housing,

a plurality of arms for removably attaching said housing to an aircraft parachute flare,

means for actuating said arms for uncoupling said housing from said aircraft parachute flare,

an ertia arm pivotally mounted in said housing for locking said means for actuating said arms,

a pin attached to said inertia arm,

an actuator slidably mounted to said housing and engageable with said pin attached to said inertia arm,

spring means for disengaging said actuator from said pin attached to said inertia arm,

a plurality of shafts slidably positioned in said housing engageable with said actuator for holding said actuator in a locking position with said pin attached to said inertia arm, and

means for disengaging said plurality of shafts from said actuator and pivoting said inertia arm whereby said means for actuating said arms is unlocked.

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3,964,397

## RAILROAD TIE HANDLING MACHINE AND METHOD

Andrew M. Dieringer, Waterford, and Gunars Eidemanis, Milwaukee, both of Wis., assignors to Rexnord Inc., Milwaukee, Wis.

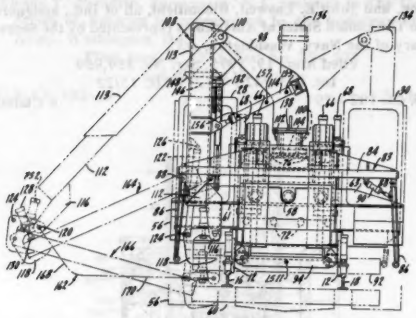
Continuation of Ser. No. 131,128, April 5, 1971, abandoned. This application Aug. 5, 1974, Ser. No. 494,611

Int. Cl.³ E01B 29/10

U.S. Cl. 104—9 35 Claims

1. A method of inserting new ties under the rails or railroad track, including the steps of initially laying the new ties on top of the rails, grasping the new ties, one at a time, by one end only, drawing the tie laterally to one side of the rails until the free end of the tie is laterally outside of the rails, lowering at least the free inner end of the tie until it is generally aligned

under the rails, inserting the tie laterally inwardly under the rails, and performing the drawing, lowering and inserting steps



while grasping and supporting the tie during such steps only by the said one end thereof.

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**3,964,398**

**MAGNETIC-SUSPENSION VEHICLE SYSTEM HAVING SWITCH TRACKS**

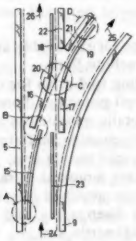
**Ulrich Breitling, Berlin, Germany, assignor to Krauss-Maffei Aktiengesellschaft, Munich, Germany**

**Filed Feb. 19, 1975, Ser. No. 551,055**

**Claims priority, application Germany, Mar. 9, 1974, 2411434**

**Int. Cl.² B61B *13/08***

**U.S. Cl. 104—148 MS** **8 Claims**



1. A magnetic suspension transport system comprising a track having a switch portion, a vehicle displaceable along said track, a respective main magnet system and auxiliary magnet system provided along each side of the vehicle and track for magnetically suspending said vehicle from and guiding said vehicle along said track, each of said systems comprising an electromagnetic primary part and an armature rail secondary part generating suspending forces between them upon energization of the electromagnet part, the primary part of each of said systems being mounted on said vehicle and the secondary part of each system being mounted on said track, said track parts having a junction site at a switch portion of the track defined as the point at which the line described by a center between the parts on one side of the vehicle intersects the line described by the center between the parts on the other side of said vehicle for passage along a spur of the switch portion and straight passage through the switch portion respectively, and means for reducing, as said vehicle approaches said intersection, the magnetic interaction between the parts of each system on the side of the vehicle traversing said intersection and the parts of the other system at the same side of said vehicle at a rate greater than the decrease in magnetic interaction between the primary and secondary parts of the same system on the side of the vehicle traversing said intersection, the armature rails of the main and auxiliary electromagnets diverging away from their respective lines toward said intersection.

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**3,964,399**

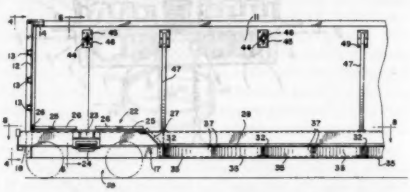
**RAILWAY GONDOLA CAR**

**Roy W. Miller, Highland, and Jack E. Gutridge, Dyer, both of Ind., assignors to Pullman Incorporated, Chicago, Ill.**

**Filed May 5, 1975, Ser. No. 574,481**

**Int. Cl.² B61D *17/10***

**U.S. Cl. 105—406 R** **10 Claims**



1. A railway car supported on spaced car trucks and including a body having vertical sides and end walls, the improvement comprising,

an underframe including a longitudinally extending center sill,

floor portions disposed at opposite ends of said car providing first elevated floor structures,

a bolster structure connected to said sides, floor portions and to said center sill on opposite sides thereof,

a second central depressed floor structure positioned between the ends and below said first floor structures,

said second structure including a floor having inner end portions connected to said center sill adjacent lower portions thereof,

a plurality of longitudinally spaced vertical and continuous cross members connected at opposite ends to said side walls and having upper portions thereof connected to the underneath side of said floor for supporting the same,

said cross members having vertical walls extending downwardly from said center sill,

diagonal support members extending diagonally below said center sill and connected to said depressed floor structure for supporting the same,

said support members having first end portion connected to said cross members adjacent their connection to said side walls, and

means connecting intermediate portions of said support members to each other and to said center sill whereby said support members provide a criss-cross configuration between said cross members.

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**3,964,400**

**PALLET OF SYNTHETIC MATERIAL**

**Albertus Brand, Bussum, Netherlands, assignor to B.V. Houtindustrie "De Phoenix", Halfweg, Netherlands**

**Filed Aug. 28, 1974, Ser. No. 501,284**

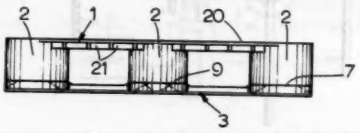
**Claims priority, application Netherlands, June 17, 1974, 7408025**

**Int. Cl.² B65D *19/32***

**U.S. Cl. 108—51** **8 Claims**

1. A pallet of synthetic material comprising an upper platform; a lower platform having locking holes therein, nine upright hollow columns interconnecting said upper and said lower platform, each column having an upright outer wall defining the periphery thereof, said columns comprising eight outer columns and a central inner column, four of said outer columns being positioned in the corners of the pallet and the other four outer columns being each positioned intermediate two corners of the pallet, downwardly extending locking

hooks at the lower ends of each of said column, said hooks being snapped through said locking holes in said lower platform, said upper platform and said columns jointly forming an integral unit, said lower platform forming an integral unit, each said locking hook being located within the cross-sectional dimensions of its respective column, said lower platform including a perforated top wall, nine downwardly extending main stiffening ribs being formed underneath said top wall, the upright outer wall of each said column being aligned with one each of said main stiffening ribs of the lower platform, each main stiffening rib defining a periphery corresponding to that of the aligned upright outer wall of its corresponding column, auxiliary downwardly extending stiffening ribs extending between each main stiffening rib and a central junction, said locking holes in the lower platform being located proximate said main stiffening ribs and having a rectangular cross-sec-




tion, said locking hooks engaging underneath the perforated top wall, said top wall of said lower platform including a rectangular framework portion, the width of said framework portion substantially corresponding to the width of said other four outer columns positioned thereabove, central strips joining in the central zone of said top wall above which said central inner column is located, connecting the central area of opposite sides of said framework portion to each other, said framework portion of the top wall of the lower platform including outer downwardly and outwardly extending guide edges positioned between successive main stiffening ribs, the upper platform comprising a perforated top wall, and downwardly extending stiffening ribs formed underneath said top wall, and a plurality of downwardly extending stiffening ribs being formed within each column extending between the upright wall of said column and a central junction.

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**3,964,401**

## TYPEWRITER AND BOOKKEEPING MACHINE WORK UNIT FOR THE FORMATION OF A WORK UNIT CHAIN

**Karl Gutmann, Jr., Unterkirnach, and Rupert Eder, Villingen, both of Germany, assignors to Firma Karl Gutmann KG, Germany**

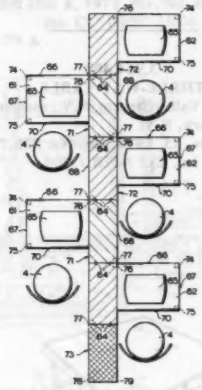
**Filed June 25, 1971, Ser. No. 156,915**

**Claims priority, application Germany, June 25, 1970, 2031450; Mar. 10, 1971, 2111419**

**Int. Cl.[2] A47B *57/00, 17/00***

**U.S. Cl. 108—64** **16 Claims**

1. A rectilinear work place unit chain comprising, in combination, a plurality of individual workplace units, for business machines such as typewriters, bookkeeping machines, and the like, each including a machine supporting substantially rectangular main table having a pair of longer sides joined by a pair of narrow edges, the main tables of successive workplace units extending laterally in opposite directions from the chain with their longer sides substantially perpendicular to the length of the chain; a plurality of substantially rectangular side tables each respective to only a single individual main table and forming a unit therewith, and having a pair of longer sides joined by a pair of narrow edges, the longer sides of said side tables extending parallel to the narrow edges of said main tables; said side tables being arranged end-to-end in a single row; each table including a table top supported on a substantially horizontal table top metal frame; respective tubular metal legs supporting each table top metal frame; the metal frame and table top of each side table having, longitudinally of said chain, slightly longer side lengths than the metal frame and table top of the associated main table; means disengageably interconnecting the narrow edges of the metal frames of said side tables; said side tables including second substantially horizontal metal frames supported on the associated metal legs in spaced relation below their table top metal frames; and respective shelves supported on each said second metal frame; the table top and shelf of each side table defining an empty inter-space opening in a lateral direction away from the asso-



ciated main table; said interconnected side tables defining a continuous rectilinear table band extending substantially centrally between said main tables with each said empty interspace being laterally aligned with, and opening toward, a main table seating position on the opposite side of said band from the main table associated with the respective side table; the table tops of said side tables being substantially coplanar and at a level higher than the table tops of said main tables.

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**3,964,402**

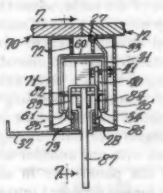
## PORTABLE STAGE

**James F. Jenne; Irvin E. Dorschner, both of Owatonna; Harvey M. Urch, West Concord, and Jerry A. Wenger, Owatonna, all of Minn., assignors to Wenger Corporation, Owatonna, Minn.**

**Filed May 1, 1974, Ser. No. 465,925**

**Int. Cl.[2] F16B *1/00***

**U.S. Cl. 108—64** **10 Claims**



1. A portable stage having plural separable stage units and means for holding adjacent stage units in fixed relation including a pair of elongate grooved members attached one to each stage unit and opening outwardly therefrom and with a pair of inturned flanges on each member, a clamp mechanism positioned within the grooves of both of said grooved members and including rigid members between and in engagement with said pairs of flanges to define a tongue and groove connection between units for imparting rigidity to said grooved members and having pivotally mounted means to move behind and engage a flange on each of said grooved members and hold said grooved members locked to each other.

7. A portable stage having clamp mechanism for attaching adjacent stage units, said clamp mechanism comprising a generally L-shape elongate mounting plate, a pair of plates associated with said mounting plate at spaced locations to define a pair of rectangular housings, a pivotable clamp member pivotally mounted at each housing and including a U-shaped member with a pair of spaced legs, a handle connected to said clamp member, and means for holding said clamp member in either a clamping or nonclamping position.

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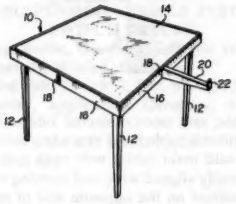
3,964,403

## THREE-WAY TABLE

Milton Schankman, Valley Stream, N.Y., assignor to Stakmore Co., Inc., New York, N.Y.

Filed Dec. 23, 1974, Ser. No. 535,791
Int. Cl.² A47B *13/08*
U.S. Cl. 108—90 10 Claims



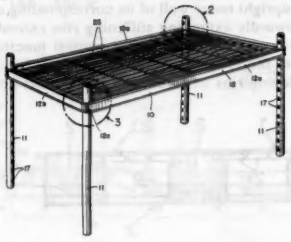

1. A convertible table combination having three alternatively usable table tops, said combination including a basic table structure with a fixed top portion having a table top as a permanent part thereof, and legs connected with the fixed top portion for supporting said structure from a floor or other underlying support, a conversion top that fits over the fixed top portion extending beyond the perimeter of the fixed top portion, the conversion top having opposite surfaces, either of which can rest on the fixed top portion and either of which is used as the top surface of the table, when the opposite surface rests on said fixed top portion, each of said opposite surfaces of the conversion top having different surface treatment in accordance with its intended use and one of the surfaces of the conversion top having a surface treatment that makes it a game table, the conversion top comprising hinged panels that fold together when not in use to reduce its size for storage, said panels having edge faces confronting one another and substantially in contact with one another when the conversion top is unfolded and the panels are in alignment with one another, and invisible hinges recessed into said edge faces and securing the panels to one another, said hinges being hidden from view when the conversion top is unfolded and either surface of the conversion top is uppermost, and the invisible hinges having sliding and pivotal portions that move far enough to bring the sections into substantially parallel relation with one another when said panels are folded into parallel relation with one another, the fixed top portion having supports movably attached thereto and extending outwardly therefrom under the conversion top, and restraining elements at the outer ends of the supports in position to extend upward at angularly spaced locations and into contact with the perimeter of the conversion top for holding the conversion top against horizontal movement with respect to the fixed top.

3,964,404

## SHELF AND CORNER POST ASSEMBLY

Floyd F. Mueller, and William A. Gelbuda, both of Two Rivers, Wis., assignors to American Hospital Supply Corporation, Evanston, Ill.

Filed May 9, 1975, Ser. No. 576,038
Int. Cl.² A47B *9/00*
U.S. Cl. 108—144 25 Claims




1. A shelf and corner post combination, said post having at least one series of vertically-spaced recesses, said shelf including a perimetric frame having adjacent frame members merging to define a corner section, said shelf also including a horizontal brace spanning said adjacent frame members and spaced inwardly from said corner section, said post being freely receivable between said corner section and said brace for selective adjustment of the elevation of said shelf, a U-shaped clip having spaced upper and lower arms joined by a connecting portion, at least one of said arms being provided at the free end thereof with bearing means selectively receivable in each of the recesses of said series, and adjustable connecting means for securing said clip and brace together and for urging said bearing means into engagement with said recessed post to clamp said post between said clip and the corner section of said frame.

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3,964,405

## PERENNIAL WEED CONTROL BY DEEP PLACEMENT OF VOLATILE SOIL FUMIGANTS

William A. Haglund, P.O. Box 693, Mount Vernon, Wash. 98273, and Theodore P. Reiling, 500 Boright Apt. 101, Le Sueur, Minn. 56058

Filed Mar. 5, 1971, Ser. No. 121,576
Int. Cl.² A01C *23/02*
U.S. Cl. 111—6 13 Claims

1. A method of controlling deep rooted perennial weeds such as bind-weed and Canadian thistle by the deep injection of volatile soil fumigants at least fourteen inches below the soil surface at a horizontal spacing under thirty inches and at least at a rate of two and one half gallons per acre.

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3,964,406

## WASTE DISPOSAL APPARATUS

Arnold Brown Partridge, 3315 Maroneal St., Houston, Tex. 77025, and Joseph Frank Woerner, 823 Azalea, Houston, Tex. 77018

Filed Jan. 24, 1975, Ser. No. 543,956
Int. Cl.² F23G *5/00*
U.S. Cl. 110—8 A 9 Claims

1. Apparatus for disposing of waste by substantially complete combustion thereof comprising:

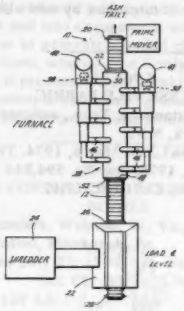
furnace means for burning the waste;

conveyor means for moving said waste through said furnace means;

means for depositing said waste on said conveyor means for movement through said furnace means; and

means for removing resulting residue from said conveyor means after said waste has passed through said furnace means;

said furnace means comprising an elongated primary burning area through which said conveyor means passes and

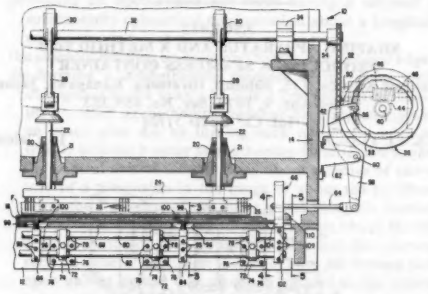



an elongated secondary burner area directly above said primary burner area for burning any emissions remaining after burning in said primary burner area, said primary and secondary burner areas communicating with each other through vertical passageways therebetween longitudinally spaced along the length of said furnace means.

## 3,964,407
## SHIFTABLE NEEDLE PLATE

**Gary L. Ingram, Ooltewah; Jimmie D. Scott, Harrison, and Randel P. Smith, Chattanooga, all of Tenn., assignors to The Singer Company, New York, N.Y.**

**Filed Jan. 12, 1976, Ser. No. 648,602**
**Int. Cl.² D05C *15/30***
**U.S. Cl. 112—79 R** **2 Claims**

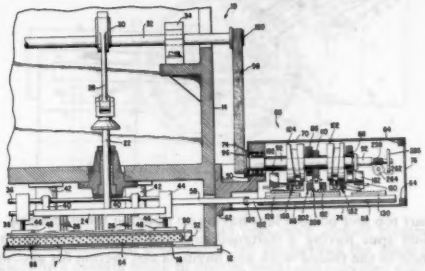


1. In a tufting machine having a plurality of needles arranged substantially in a row laterally across the machine, a needle plate for supporting a backing fabric relative to said needles, means for feeding the backing fabric longitudinally of the machine over the needle plate, means for actuating said needles for penetrating said backing fabric to insert loops of yarn therein upon each penetration of the needles, and patterning means for shifting the needle plate and backing fabric laterally of the machine and relatively to the needles comprising: a plurality of laterally spaced bearing blocks secured to the machine below the needle plate, a plurality of spaced linear bearings in each bearing block, each bearing in each block being aligned with a corresponding bearing in the other blocks, a rod received in corresponding bearings of each block, clamping means for securing said rods to the needle plate, means for imparting lateral movement to the rods in accordance with a pattern, and laterally extending roller means including means supporting said roller means for rotation relative to and for movement with the needle plate, said roller means including a multiplicity of picks for engaging the backing fabric.

## 3,964,408
## PATTERNING DEVICE FOR TUFTING MACHINES OR THE LIKE

**Randel P. Smith, Chattanooga, Tenn., assignor to The Singer Company, New York, N.Y.**

**Filed Oct. 8, 1975, Ser. No. 620,526**
**Int. Cl.² D05C *15/26***
**U.S. Cl. 112—79 A** **21 Claims**



1. A patterning device for a tufting machine having a plurality of reciprocating needles disposed laterally across the machine and adapted to penetrate a backing fabric moving longitudinally of the machine to insert a plurality of stitches upon each penetration of the backing fabric, and shiftable means including a drive bar for providing relative lateral movement between the needles and the backing fabric, said patterning device comprising: a housing, carriage means supported in said housing for oscillatory translational movement, means for driving said carriage means in a first direction and in a second direction opposite to said first direction in timed relationship with the reciprocation of said needles, said carriage means moving in said first direction while said needles are free of said backing fabric, a motion transferring member mounted in said housing, complementary coupling means carried by said carriage means and said motion transferring member for coupling the motion transferring member selectively to the carriage only when the carriage means is moving in said first direction, pattern control means for actuating said coupling means selectively prior to movement of said carriage means in said first direction, said motion transferring member including a keeper member, a locking tooth journalled in said housing for engagement with said keeper member for securing said motion transferring member, locking tooth control means operable in timed relationship with the reciprocation of said needles for holding said locking tooth in locking engagement with said keeper member and, for releasing said tooth from said keeper member only when said carriage means is moving in said first direction and means for connecting said motion transferring member to said drive bar.

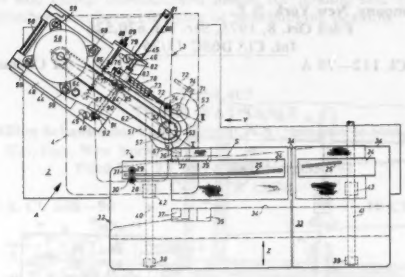
## 3,964,409
## DEVICE FOR SEWING AND CUTTING-OPEN TUCKS ON CUT PIECES OF GARMENTS

**Gunther Mall, and Werner Striegler, both of Kaiserslautern, Germany, assignors to Pfaff Industriemaschinen GmbH, Germany**

**Filed Sept. 18, 1974, Ser. No. 507,135**
**Claims priority, application Germany, Oct. 12, 1973, 7336850**
**Int. Cl.² D05B *37/08***
**U.S. Cl. 112—121.15** **5 Claims**

1. A device for use on a sewing unit in sewing and cutting open tucks of cut pieces of garments, comprising a sewing machine having a stitch formation zone, and a work advance table having an edge around which the work is folded, a tem-

plate rail extending over said table which is conformable to the shape of the seam and adapted to be engaged on the work and which extends past the stitch formation zone of the sewing machine, a cutting knife which is introduceable between the fabric layers of the folded work, said work advance table being formed, at least partly, with a forked cross-section with spaced



apart top and bottom legs having an opening therebetween, a guide spur having a flattened end engageable between the fabric of the folded work and having a slot therein for accommodating said cutter, and mounting means mounting said cutting knife and said guide spur for movement toward and away from said table.

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**3,964,410**

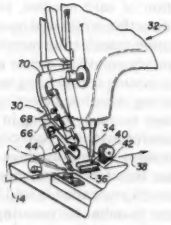
**ELASTIC INSERTER FOR A SEWING MACHINE**

**Ronald J. Boser, 19 Branwood Drive, Dix Hills, N.Y. 11746, and Gerald Gluckin, 440 E. 57th St., New York, N.Y. 10022**

**Filed Jan. 24, 1975, Ser. No. 543,663**

**Int. Cl.² D05B *23/00***

**U.S. Cl. 112—121.26** **10 Claims**



**1.** In combination, a sewing machine including a sewing needle and feed dogs defining a sewing station, means defining a fabric feed path into said sewing station, a fabric hemming device located along said fabric feed path in advance of said sewing station, and an elastic inserter located adjacent the exit end of said fabric hemming device for inserting elastic into said hem for sewing attachment to the fabric fed into said sewing station, said elastic inserter comprising a supply of elastic, means defining an elastic feed path oriented transversely of said fabric feed path, an elastic-tensioning means disposed along said elastic feed path mounted for movement between movement-resisting contact with said elastic for tensioning the same and a clearance position in relation therewith, a rigid enclosure member about the supply length of elastic movable from a ready position along said elastic feed path simultaneously with said elastic positioned therein through an elastic-feed stroke into abutting contact with said elastic-tensioning means incident to urging said elastic-tensioning means into said clearance position thereof, an elastic-engaging means operable to further urge said elastic through said rigid enclosure member along said feed path to thereby locate the leading edge of said elastic at said sewing station and under the feed control of said feed dogs, and means withdrawing said enclosure member back into said ready position thereof incident to permitting movement-resistant contact of said elastic-tensioning means with said elastic, whereby during subsequent feed movement of said elastic as produced by said feed dogs said elastic is tensioned by said elastic-tensioning means.

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**3,964,411**

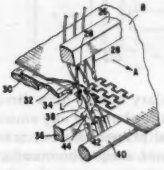
**DENSE PILE FABRIC**

**Randel P. Smith, Chattanooga, Tenn., assignor to The Singer Company, New York, N.Y.**

**Division of Ser. No. 467,335, May 6, 1974. This application July 9, 1975, Ser. No. 594,844**

**Int. Cl.² D05C *17/02***

**U.S. Cl. 112—410** **1 Claim**



**1.** A tufted pile fabric comprising a backing fabric having a plurality of longitudinally extending lateral rows of tufts extending from a first surface thereof to form a tufted pile surface, each of said tufts extending from a point in the backing fabric, and rows of backstitch on a second surface thereof opposite from said first surface, said backstitch comprising a single strand of yarn extending between at least two points in the same lateral row and from one of said points longitudinally to a point in the adjacent lateral row.

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**3,964,412**

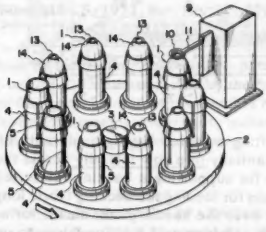
**SHAPING APPARATUS AND A METHOD FOR PRODUCING A SEAMLESS CONTAINER**

**Kaname Kitsuda, 115, Shinshu, Hiratsuka, Kanagawa, Japan**

**Filed Apr. 9, 1974, Ser. No. 459,353**

**Int. Cl.² B21D *51/24***

**U.S. Cl. 113—7. R** **14 Claims**



**1.** In an apparatus for converting a hollow cylindrical blank workpiece into a seamless container having a trunk and a neck portion connected by a shoulder portion, particularly a container able to withstand high internal pressures, a combination comprising a carrier having a plurality of spaced work stations; means for successively indexing said carrier to respective ones of said work stations; a plurality of workpiece-holding frames on said carrier and each having a cylindrical portion adapted to receive and firmly support the entire portion of a blank which will correspond to the trunk portion of the finished container; shaping means at some of said work stations adapted to move axially of the respective workpiece-

holding frames for successively shaping an upper portion of the blank to form the shoulder and neck portions of the container; and clamping means at said working stations at which said shaping means are located for securely holding said workpieces during their shaping, including first cooperating means on said cylindrical portions and second cooperating means movable axially towards said cylindrical portions with said shaping means and into engagement with said first cooperating means so as to generate a radial clamping force on said cylindrical portions, whereby the firmly supported trunk portion of a blank is prevented from wrinkling under the effect of the axial movement of said shaping means during the conversion of the blank into a finished container.

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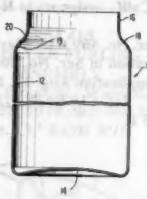
**3,964,413**

## METHODS FOR NECKING-IN SHEET METAL CAN BODIES

**William T. Saunders, Weirton, W. Va., assignor to National Steel Corporation, Pittsburgh, Pa.**

**Filed July 22, 1974, Ser. No. 490,281**
**Int. Cl.² B21D *51/00***
**U.S. Cl. 113—120 AA** **5 Claims**



1. In the manufacture of a sheet metal container, a multistage die-forming method for necking-in the open end of a can body to provide flanging metal free of wrinkles, comprising the steps of

providing an open-ended can body having a sidewall of substantially cylindrical configuration about a longitudinally extended central axis,

the sidewall defining an open end having a peripheral edge,

die-forming a strengthening member in the sheet metal contiguous to the open-end with a first set of dies including an outer strengthening-member die cooperating with an inner pilot die by turning such peripheral edge inwardly with such outer strengthening-member die toward the central axis of the can body about a radius of curvature of a dimension in the range of about ten to fifteen times the thickness of the sheet metal being die formed, the peripheral edge being turned inwardly about the full circumference of such peripheral edge and then turning such peripheral edge with the inner pilot die toward such open end to extend in a direction parallel to the central axis, such extension of sheet metal in the direction parallel to the central axis having a longitudinal dimension of less than .0625 inch, and then

die-forming such open end with strengthening member to form a reduced diameter neck with a second set of dies including an outer necking-in die and an inner pilot-type die by contacting the can body sidewall at a location adjacent to but spaced longitudinally from the strengthening member with the outer necking-in die to form a curvilinear configuration transition zone between the original can body and the reduced diameter neck and to form wrinkle-free flanging metal, such transition zone being formed about a radius of curvature which is greater than fifteen times the thickness gage of the sheet metal being die formed,

such necked-in flanging metal having a longitudinal dimension which is a plurality of times greater than the corresponding longitudinal dimension of the initially formed strengthening member.

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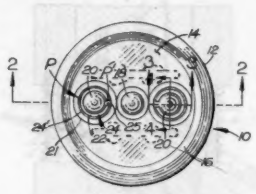
**3,964,414**

## EASY OPEN END METHOD AND APPARATUS

**Gordon R. Gane, Pleasanton, Calif., assignor to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.**

**Division of Ser. No. 478,407, June 11, 1974, Pat. No. 3,902,627, which is a continuation-in-part of Ser. No. 448,157, March 4, 1974, abandoned. This application Apr. 7, 1975, Ser. No. 565,494**
**Int. Cl.² B21D *51/44***
**U.S. Cl. 113—121 C** **38 Claims**



1. A method for producing an easy open closure member having at least one depressible tab comprising the steps of selecting a closure blank of ductile metal and provided with a main panel and an outer peripheral reinforcing rib, initially working and simultaneously subjecting a portion of the panel closer to the center of the panel than to said rib and at least one additional portion of the panel located intermediate a selected part of the said rib and first mentioned portion of the panel to selective drawing pressures and forming an embossment in said first mentioned panel portion and a shallow outwardly disposed dimple in said second mentioned panel portion without at the same time effecting any significant thinning of the metal in the wall of the said dimple except in the extreme top portion thereof, then without materially disturbing at least the major part of the embossment and while controlling the flow of the metal making up the dimple and directing the metal in the top of the dimple slightly outwardly into a confined arcuate opening, reworking and reshaping the metal in the peripheral base portion of the said dimple to form selectively offset concentric inner and outer dimple base sections interconnected by a web and then without effecting any material thinning of any part of the dimple located in the arcuate opening and at least most of said base sections subjecting said web to compressive forces and materially thinning all but a selected amount of the material in the said web to provide an embrittled thin tear line section in the web and while effecting said thinning of the web and forming said tear line section allowing the terminal ends of the tear line section to form and recede into a depressible tab hinge portion.

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**3,964,415**

## CAN CLOSURE

**Harris W. Viker, Roseville, and William E. Kropp, North St. Paul, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Division of Ser. No. 393,001, Aug. 30, 1973, Pat. No. 3,889,844. This application Jan. 14, 1975, Ser. No. 540,980**
**Int. Cl.² B21D *51/44***
**U.S. Cl. 113—121 C** **3 Claims**

1. A method of making an end piece for use in fabricating a sealed pressurized container, comprising the steps of

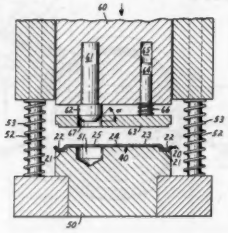
obtaining a pre-formed circular end piece of the type used in fabricating metal cans, said end piece having a depressed center portion with a pour hole therein and a circumferential lip for clamping over and sealing to one end of an annular can body,

applying a strip of normally tacky and pressure-sensitive tape to the depressed center portion so as to overlie the pour hole and be sealed to the circumjacent surface,

supporting the taped side of the end piece with a support means in an area adjacent to but spaced slightly radially outward from the pour hole,

firmly gripping the end piece in said area, and

providing a blunt punch with a tapered head which has a varying cross-sectional diameter in planes taken at right angles to its axis, the distal end of the punch head having a cross-sectional diameter smaller than the corresponding



diameter of the pour hole and the main body of the punch head having a corresponding diameter larger than that of the pour hole, and

forcing the punch head into the pour hole, thereby imparting an outwardly tapered configuration to the taped side of the end piece in the area circumjacent the pour hole, simultaneously stretching the tape and leaving it firmly adhered to the end piece.

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**3,964,416**

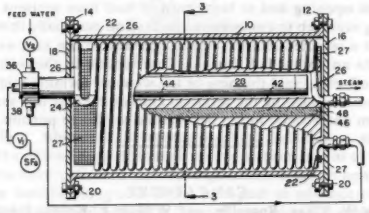
**BOILER REACTOR**

**Raymond J. Kiraly, Highland Heights; Bernard H. Affeldt, Auburn, and Charles R. Anspach, Willoughby Hills, all of Ohio, assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed July 19, 1965, Ser. No. 473,573**

**Int. Cl.² B63H *21/08***

**U.S. Cl. 114—20 A** **2 Claims**




1. A steam boiler-reactor comprising;

a. a cylindrical casing having closures at opposite ends thereof,

b. a steam generating tube, formed in a helical coil, disposed adjacent the inner surface of said casing and extending substantially between its opposite ends, said coil having an inlet end to which feed water may be delivered and an outlet end from which steam may be delivered to a steam engine,

c. a cylindrical screen disposed within and adjacent the helical coil,

d. an elongated oxidant injector nozzle tube, having a row of axially spaced injection orifices, extending longitudinally of said casing and within the space within said screen,

e. a solid grain of cast lithium substantially filling the remainder of the space within said screen,

f. an oxidant comprising a source of sulphur hexafluoride under pressure communicating with said nozzle tube through a valve adapted to control the rate of flow of same,

g. said nozzle tube having longitudinally extending conduits therein through which water may be circulated for cooling it,

h. means for supplying feed water to said conduits and thence to the inlet end of said steam generating tube,

i. and a source of heat for melting said grain of lithium,

j. the construction and arrangement being such that when said source of heat has melted the lithium, the oxidant may be injected into the latter for reaction with the molten lithium, the products of reaction occupying substantially the same space as the original volume of lithium, said screen preventing undesired reactions adjacent the walls of the steam coil.

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**3,964,417**

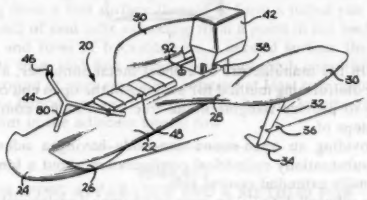
**WATER VEHICLES**

**Marshall L. Williams, Santa Monica, and William P. Peschel, Venice, both of Calif., assignors to Hydrobike Incorporated, Venice, Calif.**

**Continuation of Ser. No. 469,633, May 14, 1974, abandoned, which is a continuation of Ser. No. 305,302, Nov. 10, 1972, abandoned. This application Aug. 22, 1975, Ser. No. 606,768**

**Int. Cl.² B63B *1/20***

**U.S. Cl. 114—66.5 H** **26 Claims**



1. A water vehicle comprising:

a hull member having a means for receiving at least one person to be transported, said hull member providing substantial flotation when said vehicle is at rest in the water;

planing surface means forward of the center of gravity of said vehicle, said planing surface means being the primary support for said vehicle forward of said center of gravity when said vehicle is propelled over the water at a suitably high speed; and

hydrofoil means disposed at a lower elevation than said hull member and at longitudinal position aft of the center of gravity of said vehicle, said hydrofoil means being the primary support for said vehicle aft of said center of gravity when said vehicle is propelled over the water at a suitably high speed.

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**3,964,418**

**FLOATING CAMPGROUND**

**Stanley D. Karnik, 374 Limestone Road, Ridgefield, Conn. 06877, and Terry E. Morgan, 2094 Maple Ave., Peekskill, N.Y. 10566**

**Filed Mar. 6, 1974, Ser. No. 448,739**

**Int. Cl.² B63B *27/14***

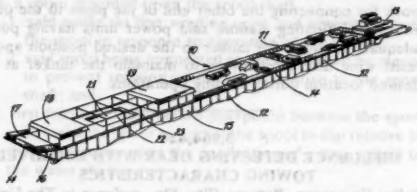
**U.S. Cl. 114—70** **10 Claims**

1. A floating campground for recreational vehicles comprising:

at least one camping barge unit having a substantially flat upper deck surface and including utility hookups and

services at predetermined intervals and means for securing recreational vehicles in a fixed position on said surface with sufficient space therebetween to simulate an actual campground,

at least one recreational barge unit including a pool on the upper surface thereof and at least one enclosed structure



mounted on the deck and having recreational facilities therein,

flexible means for coupling the barge units together in a predetermined arrangement, and, propulsion means connected to one of said barge units for transporting the coupled units over waterways.

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**3,964,419**

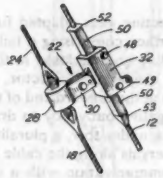
## ANTI-FOULING ROLLER FURLING GEAR UPPER ASSEMBLY

**Ronald L. Uecker, 915 Grant St., Wausau, Wis. 54401**

**Filed Nov. 27, 1974, Ser. No. 527,771**

**Int. Cl.² B63H** *9/10*

**U.S. Cl. 114—106** **59 Claims**



1. Anti-fouling roller furling sail handling apparatus comprising:

a. a stay bushing member adapted to be secured to a stay member;

b. a stay slide member having an elongated portion with an axial bore therethrough adapted to receive a stay;

c. said stay slide being adapted to slidably engage said stay bushing;

d. means for attaching said stay slide to sail tackle;

e. cooperating means on said stay slide and stay bushing adapted for controlling the amount of rotation of said stay slide about said stay bushing within preselected limits; and

f. said apparatus thereby reducing fouling of sail and/or sail tackle around said stay when said sail is in a raised position during roller furling of the sail.

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**3,964,420**

## ADJUSTABLE ANCHOR

**William Taylor Stelling, 175 W. 72nd St., New York, N.Y. 10023**

**Filed Aug. 18, 1975, Ser. No. 605,790**

**Int. Cl.² B63B** *21/44*

**U.S. Cl. 114—208 R** **9 Claims**

1. An exchangeable anchor assembly, comprising

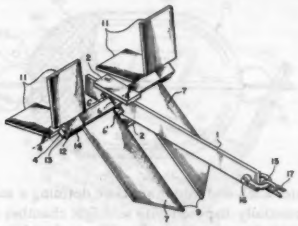
a stem having a free end adapted to be connected to a line,

two parallel plates disposed at an opposite end of said stem sandwiching said stem therebetween,

a cross bar rotatably disposed between said plates perpendicular to said stem, said cross bar having an unround cross section,

two flukes each having an opening substantially the same as the cross section of said cross bar and slidable thereon from opposite ends thereof,

two stabilizers each comprising two vane plates angularly disposed relative to each other and a sleeve connected to each of said vane plates and having an opening substan-



tially equal to that of said cross bar and disposed on the ends thereof,

means for securing said two stabilizers on said cross bar, thereby holding said flukes therebetween, and

projection cam means operatively mounted on said cross bar and having cam projections cooperating with said plates, permitting relative rotatable movement of said cross bar and for limiting the rotatable movement of said cross bar when said cam projections abut said plates.

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**3,964,421**

## ANCHOR

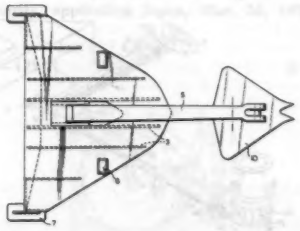
**Rob van den Haak, Allegro 114, Krimpen aan den Ijssel, Netherlands**

**Filed Apr. 28, 1975, Ser. No. 572,687**

**Claims priority, application United Kingdom, Dec. 10, 1974, 53338/74**

**Int. Cl.² B63B** *21/40*

**U.S. Cl. 114—208 R** **4 Claims**



1. An anchor having a pointed fluke, a shank which is pivotally connected to the fluke, and a ground slide, wherein the fluke has a delta-shaped, closed hollow structure of a forwardly and downwardly curved configuration terminating in a single central point, combined with a ground slide comprising a pair of slide plates, one on each side of its centerline.

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**3,964,422**

## MARINE FENDER

**Harold B. Boyd, 9771 Via Zibello, Burbank, Calif. 91504**

**Filed Sept. 18, 1975, Ser. No. 614,483**

**Int. Cl.² B63B** *59/02*

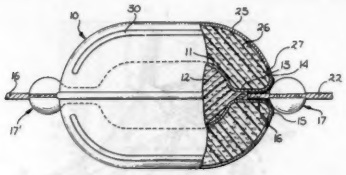
**U.S. Cl. 114—219** **9 Claims**

1. A marine fender comprising the combination of:

an inner core having open-opposite ends leading into a first chamber defined by the inner wall surface of said core;

each of said open opposite ends of said core provided with an integral outwardly flared portion terminating in a circular edge;

an outer shell coaxially disposed with respect to said inner core having circular opposite ends joined to said flared portions circular edges respectively so as to provide an integral joint therewith;



said outer shell and said inner core defining a second chamber coaxially disposed with said first chamber and defined between the opposing wall surfaces of said inner core and said outer shell respectively;

a first plastic foam filler material of a given density occupying said first chamber and a second plastic foam filler material of a density less than said given density of said first foam filler material occupying said second chamber; and

swivel means carried on a rope passing through said core at opposite ends of said fender.

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**3,964,423**

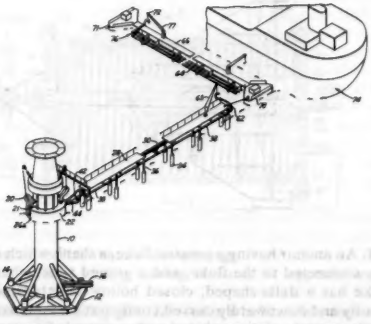
## OFFSHORE TERMINAL

**Paul L. Gassett, and Wilfred R. McLeod, both of Houston, Tex., assignors to Gulf Research & Development Company, Pittsburgh, Pa.**

**Continuation of Ser. No. 426,355, Dec. 19, 1973, abandoned, which is a continuation of Ser. No. 297,564, Oct. 13, 1972, abandoned, which is a division of Ser. No. 126,661, March 22, 1971, Pat. No. 3,765,463. This application Feb. 24, 1975, Ser. No. 552,465**

**Int. Cl.² B63B *21/56***

**U.S. Cl. 114—230** **7 Claims**



1. In an offshore terminal for delivering oil from one to the other of a tanker and an elongated floating station adapted to rotate about a terminal unit connected by delivery lines to onshore storage, said floating station having an outer end remote from the terminal unit and an inner end connected to the terminal unit for delivery of oil thereto, an improved loading boom comprising an elongated framework spaced from the terminal unit and movable independently thereof, a power unit at each end of the framework for movement of each end of the loading boom independently of the other end, a plurality of pipes supported by the framework and extending substantially the full length of said framework, float means extending downwardly into the water at intervals located between the power units to support the framework above the water, first flexible conduit means at one end of the framework for connecting one end of the pipes to the tanker, and second flexible conduit means at the other end of the framework for connecting the other end of the pipes to the outer end of the floating station, said power units having power adequate to move the tanker to the desired position and to resist wind and wave forces to maintain the tanker at the desired location during loading operations.

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**3,964,424**

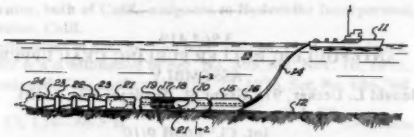
## INFLUENCE DETECTING GEAR WITH IMPROVED TOWING CHARACTERISTICS

**Julius Hagemann, Panama City, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Apr. 2, 1958, Ser. No. 726,019**

**Int. Cl.² B63B *21/56***

**U.S. Cl. 114—235 B** **4 Claims**



1. A towable detecting gear adapted for dragging over a water-submerged surface comprising a tail portion, a towing cable having its trailing end enclosed in the tail portion and having at least one insulated conductor, a weight member secured to said cable at the forward end of the tail portion and having sufficient negative buoyancy to drag along said submerged surface when under tow, a plurality of detecting devices disposed at intervals along the cable in said tail portion and in electrical communication with a conductor therein, said detecting devices being substantially larger in cross section than the diameter of said cable, a layer of buoyant material surrounding said cable between said devices and having a thickness such that its diameter is at least equal to the diameter of said detecting devices, and an outer covering of wear resistant flexible material enclosing said tail portion.

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**3,964,425**

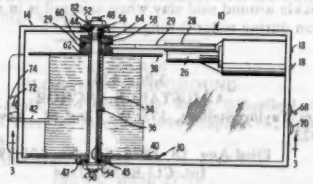
## WATER SKI LINE RETRACTOR

**Nelson C. Septor, Sr., 269 Sunnybrook Road, Springfield, Pa. 19064**

**Filed Jan. 27, 1975, Ser. No. 544,309**

**Int. Cl.² B63B *21/56***

**U.S. Cl. 114—235 WS** **4 Claims**



1. In a water ski line retractor to vary the distance between the tow end of a ski line and a boat, the combination of

A. a frame;

B. a motor mounted upon the frame,
C. a spool shaft rotatably mounted upon the frame in spaced relationship from the motor,
1. a spool pulley mounted on said spool shaft and being rotatable by said motor for spool rotating purposes;
2. said spool pulley including means to permit the spool shaft to rotate relative to said spool pulley;
D. a spool mounted upon the spool shaft,
1. said water ski line winding upon and unwinding from the spool in response to operation of the motor,
2. said spool being connected to the spool shaft by means to prevent rotation of the spool relative to the spool shaft; and
E. first friction clutch means interposed between the spool pulley and the spool to permit the spool to slip relative to the spool pulley upon the application of a drag weight to the water ski line.

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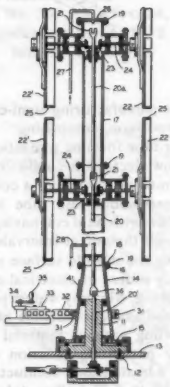
**3,964,426**
**WIND DRIVEN MECHANICAL DRIVE**
**Fred C. Lindsey, 1100 Carrington Ave., South Milwaukee, Wis. 53272**
**Filed Mar. 24, 1975, Ser. No. 561,553**
**Int. Cl.[2] B63H** *13/00*
**U.S. Cl. 115—3** **5 Claims**



3. Wind driven apparatus for using wind to activate the screw shaft of a ship, comprising:
a plurality of propellers,
said propellers being arranged in oppositely disposed pairs;
a plurality of vertical standards rotatably mounted to the deck of said ship,
said pairs of propellers rotatably supported by said vertical standards,
said propellers in each said pair disposed on opposite sides of one of said plurality of vertical standards;
transmitting means to transmit the rotary motion of said propellers to said screw shaft,
said transmitting means including a plurality of selectively interconnectable vertical shafts, with each of said vertical shafts transmitting the rotary motion of one of said pairs of propellers; and
means for simultaneously adjusting the rotation of said vertical standards; wherein said adjusting means comprises crank and pinion means, gear-type teeth integral with and horizontally disposed about the periphery of the base of each of said vertical standards, and chain means simultaneously engaging said teeth on each of said vertical standards, said chain means being connected to said crank and pinion means, whereby rotation of said crank and pinion means simultaneously rotates said vertical standards.

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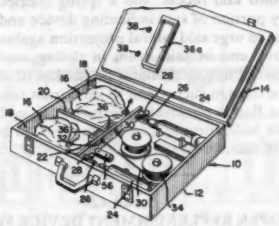
**3,964,427**
**SURVIVAL APPARATUS**
**Norma M. Murphy, Kirkland lake, Canada, assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest**
**Filed Nov. 18, 1974, Ser. No. 524,468**
**Int. Cl.[2] G08B** *5/00*
**U.S. Cl. 116—124 B** **3 Claims**



1. Apparatus for marking a physical location which comprises: a case; an assembly within said case comprising a balloon; a bottle containing pressurized helium; valve means coupled to said bottle and configured for accepting a mouth of said balloon for enabling selective inflation of said balloon; a cord secured at one end to said balloon; means in said case for storing said cord; cord measuring means mounted in said case and engaging said cord; said measuring means including a digital indication of the linear quantity of cord removed from said storing means; said case having a transparent area in register with said measuring means for enabling viewing said digital indication through said case.

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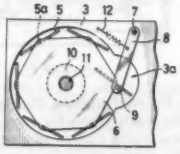
**3,964,428**
**INDICATING DEVICE HAVING A PLURALITY OF OVERTURNABLE FLAPS**
**Kiyoyuki Arai, Tokyo, Japan, assignor to Copal Company Limited, Tokyo, Japan**
**Filed Mar. 25, 1975, Ser. No. 561,995**
**Claims priority, application Japan, Mar. 26, 1974, 49-34294[U]**
**Int. Cl.[2] G09F** *7/22*
**U.S. Cl. 116—129 H** **6 Claims**



1. Indicating device comprising a plurality of overturnable indicating flaps rotatably mounted by their longitudinal central shafts along the periphery of a rotating drum, said flaps having indicating surfaces at their both sides, respectively, a guide plate located adjacent to one end of said drum and having a circular guide hole concentrically positioned with respect to the axis of said drum so as to engage at its inner periphery with side edges of the respective flaps which are parallel to the axis of said drum thereby guiding said flaps with the flaps being kept oriented in the tangential direction to the circumference of said drum as said drum rotates, said circular guide hole being formed at a portion thereof with a recess

extending outwardly of the inner periphery of said circular guide hole so as to permit the respective flaps to be overturned about their longitudinal central shafts within said recess when the flaps are brought in succession to said recess as said drum rotates, an actuating lever pivotally supported by one end thereof upon a stationary portion of said indicating device and positioned adjacent to said one end of said drum so as to be swung in a plane parallel to said one end of said drum with the free end terminating within said recess, said actuating lever being formed with a lateral projection at its free end adapted to engage with the periphery of said one end of said drum within said recess as well as with the respective flaps when brought into said recess, and a spring connected between a stationary portion of said indicating device and said actuating lever so as to urge said lateral projection against the periphery of said one end of said drum in sliding contact therewith, thereby permitting said lateral projection to abut against the respective flaps in succession as said drum rotates so that the respective flap is positively overturned in said recess for exposing the indicating surface thereof which had been faced toward the interior of said drum.

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**3,964,429**

## DEVELOPER REPLENISHMENT DEVICE FOR COPYING MACHINES

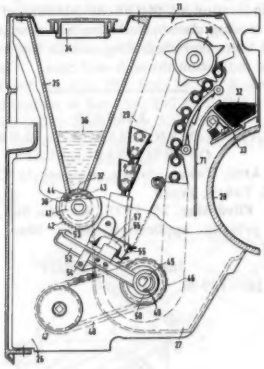
**Werner Salger, Hamburg-Langenhorn, Germany, assignor to Lumoprint Zindler KG, Hamburg, Germany**

**Filed Sept. 9, 1975, Ser. No. 611,809**

**Claims priority, application Germany, Sept. 12, 1974, 2443653**

**Int. Cl.² B05C *11/00*; F16D *4/12***

**U.S. Cl. 118—7** **13 Claims**



**1.** A device for replenishing the developer material in a copying machine, particularly for replenishment of the supply of toner to a developing unit of an electrophotographic copying machine, the device comprising a supply reservoir having a bottom opening, roller means rotatably mounted at the bottom opening of the reservoir to form a closure for the reservoir, said roller means being arranged to be driven in accordance with the required toner replenishment, first drive means comprising a rotatable shaft associated with the developing unit, conveyor means for developer material arranged to be driven from said shaft, and second drive means to drive said roller means in dependence upon the rotation of said shaft, each movement step of the roller means being a consequence of a revolution of said shaft, said second drive means comprising a toothed pawl arranged to be driven in reciprocating manner from the shaft, an associated ratchet wheel connected to said roller means and provided with a toothed peripheral portion for engagement with the pawl, and yieldable lifting means arranged to cooperate with the pawl to lift it into engagement with the ratchet wheel.

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**3,964,430**

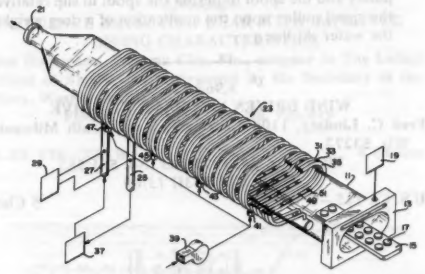
## SEMI-CONDUCTOR MANUFACTURING REACTOR INSTRUMENT WITH IMPROVED REACTOR TUBE COOLING

**Gerald W. Purmal, San Carlos, Calif., assignor to Unicorp Incorporated, Sunnyvale, Calif.**

**Filed Nov. 14, 1974, Ser. No. 523,807**

**Int. Cl.² C23C *13/08***

**U.S. Cl. 118—49** **6 Claims**



**1.** A reactor for manufacturing semi-conductor wafers by chemical vapor deposition, comprising:

a hollow reactor tube forming a reaction chamber therein,

at least one hollow electrically conductive elongated continuous tube formed in a shape of a coil with a plurality of turns positioned about said tube in a non-contacting relationship therewith, said coil having a plurality of holes through the wall thereof at intervals along its length in positions facing the outside surface of said reactor tube,

a radio frequency source of electrical energy connected to said hollow tubing, whereby wafers positioned within the reactor tube and said coil become heated,

means for directing gaseous material inside said reactor tube, thereby permitting reaction of desired gaseous material with a heated semi-conductor wafer, and

means connected to said hollow tube for providing gas thereinto at a pressure much above atmospheric pressure, whereby streams of gas escape from the plurality of holes of said tubing and are directed against the outside surface of said reactor tube.

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**3,964,431**

## DEVICE FOR SUPPLYING AN OFFSET PREVENTING LIQUID TO A FIXING ROLLER

**Ryoichi Namiki, Hino, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan**

**Filed May 17, 1974, Ser. No. 471,132**

**Claims priority, application Japan, June 1, 1973, 48-65619**

**Int. Cl.² G03G *15/20***

**U.S. Cl. 118—60** **3 Claims**

**1.** A fuser device in electrophotographic copying apparatus, comprising:

a. a fuser roller having a surface of silicone rubber;

b. a pressure roller engaging said fuser roller to provide a nip therebetween through which is passed a copy sheet electrostatically bearing a toner image oriented for contact with the peripheral surface of the fuser roller;

c. means for heating said toner image in said nip to fuse the image into the copy sheet; and

d. an applicator roller disposed in rolling contact with said surface of said fuser roller and including

i. means for retaining an offset-preventing liquid, and

ii. a liquid-permeable material layer forming the periphery of said applicator roller for permitting said liquid to pass therethrough and to be supplied to said surface of the fuser roller at a very slow rate,

e. said retaining means being made from a material capable of being impregnated with a substantial amount of said offset-preventing liquid.

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**3,964,432**

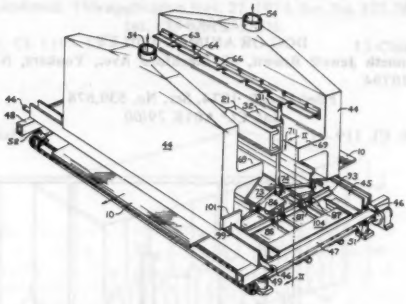
## APPARATUS FOR COATING CONTINUOUSLY ADVANCING SUBSTRATE

**Ronald L. Schwenninger, Cumberland, Md., assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Division of Ser. No. 309,049, Nov. 24, 1972, Pat. No. 3,885,066. This application Jan. 6, 1975, Ser. No. 538,988**

**Int. Cl.² B05C** *5/00*

**U.S. Cl. 118—314** **25 Claims**



1. Apparatus for producing substantially uniformly thick coatings across the width of an advancing substrate, comprising:

a spray chamber having an upstream end and a downstream end;

transporting means for advancing the substrate through said spray chamber in a downstream direction;

first exhaust means disposed at the upstream end of said spray chamber for exhausting the atmosphere within said spray chamber at a substantially uniform rate across the width of the substrate, said exhaust moving over the substrate substantially only in the upstream direction;

second exhaust means disposed at the downstream end of said chamber for exhausting the atmosphere within said spray chamber at a substantially uniform rate across the width of the substrate, said exhaust moving over the substrate substantially only in the downstream direction;

means in said spray chamber for applying a coating composition onto the upper surface of the substrate, said means including plurality spray orifices mounted above the substrate for cyclical traverse perpendicular to said downstream direction; and

baffle means spanning said spray chamber beyond the side edges of the substrate for preventing the atmosphere surrounding said spray chamber from moving transversely over the substrate in a direction other than said upstream and downstream directions.

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**3,964,433**

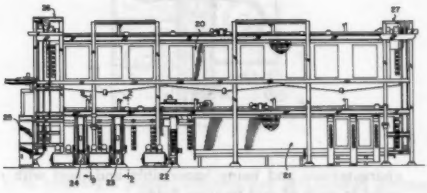
## LOAF MOLD WASHING AND RELEASE AGENT APPLYING MECHANISMS

**Robert L. Swartz, Madison, Wis., assignor to Oscar Mayer & Co. Inc., Madison, Wis.**

**Filed Mar. 11, 1975, Ser. No. 557,309**

**Int. Cl.² B05B** *7/08;* **B05C** *7/08*

**U.S. Cl. 118—314** **13 Claims**



1. In a continuous loaf processing system for producing a molded loaf food product from a stuffable raw food material including a plurality of wheel supported magazines of tubular loaf molds being driven step-by-step at predetermined time intervals along tracks through a closed loop of work stations, each magazine of molds having a plurality of interconnected vertically aligned and horizontally extending molds, each mold having a plug at one end movably positionable within the mold and a removable cover for the other end, said plug coacting with a ratchet take-up device for regulating expansion and contraction of the food material during processing, means on the molds for hanging the removable covers, and wheels connected to the molds for movably supporting the magazine on rails for movement thereof along a path transverse the longitudinal axis of the molds, mechanism for treating said magazines preparatory to stuffing comprising: a housing into which a magazine of molds is driven for treatment and out of which it is driven following a treatment cycle and which includes a treatment chamber, doors for the chamber, means driving the doors between open and closed positions during ingress and egress of a magazine, a wand assembly having a plurality of wands with spray nozzles, one wand for each mold, means mounting the wand assembly for movement to cause the wand spray nozzles to traverse the interior of the molds, and means supplying a treatment material to the nozzles for treating the insides of the molds.

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**3,964,434**

## COATING APPARATUS INCLUDING LIQUID SEALANT BETWEEN COMPARTMENTS

**Stanford L. Adler, Monsey, and Alexander M. Saunders, Bedford Village, both of N.Y., assignors to Technicon Instruments Corporation, Tarrytown, N.Y.**

**Filed Nov. 4, 1974, Ser. No. 520,586**

**Int. Cl.² B05C** *3/15*

**U.S. Cl. 118—405** **7 Claims**

1. Apparatus for treating a continuous surface of a web with different fluids including reactants comprising:

at least a pair of treating chambers having a common wall therebetween and an entry and an exit slot disposed in respective side walls lying in the same general plane;

a sealing chamber defined in part by said side walls;

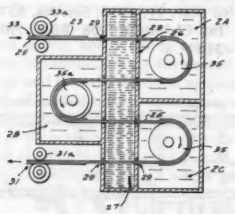
at least a third treating chamber having in common with said sealing chamber a wall opposed to said side walls;

a first pair of slots in said opposed wall, each of said last mentioned slots being alined with one of said entry or exit slots of a separate prior recited treating chamber;

a second pair of slots in said opposed wall which are external to said third treating chamber and each of said last mentioned slots being alined with a separate one of the other of said entry or exit slots;

a treating fluid in each of said treating chambers at a level above said slots associated therewith;

a liquid sealant disposed in said sealing chamber to a level above each of said slots, having a high-surface-tension



characteristic and being immersible and inert with respect to each of said treating fluids;

each of said slots being of a dimension whereby to retain said sealant by surface tension; and

roller guide means operatively associated with each of said chambers whereby said web may enter and exit from said apparatus through said sealing chamber and travel sequentially through each of the alined pairs of slots for treatment in each of the three recited treating fluids.

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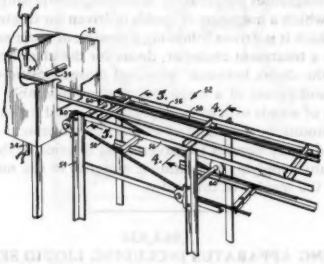
**3,964,435**

## APPARATUS FOR COATING ELONGATED OBJECTS OF SMALL DIAMETER

**Roy L. Horn, Philadelphia, and M. Jack Lane, Langhorne, both of Pa., assignors to H. C. Price Co., Bartlesville, Okla.**

**Filed Feb. 26, 1975, Ser. No. 553,245**
**Int. Cl.² B05B** *5/02*
**U.S. Cl. 118—630** **12 Claims**



1. Structure for conveying an elongated object of small diameter, sais structure comprising:

closed conveyor means adapted for movement;

a power source coupled with said conveyor means for moving the latter;

a plurality of first flights coupled with said conveyor means in spaced apart relationship,

each of said first flights presenting a first groove for contiguously receiving said object in supporting relationship and

a second conveyor flight coupled with said conveyor means intermediate said first flight,

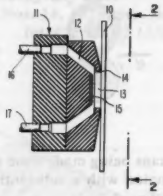
said second flight presenting a second groove which is normally disposed in spaced relationship to said object when the latter is supported by said first grooves, while also being adapted to receive said object in supporting relationship.

**3,964,436**

## ELECTROPHOTOGRAPHIC DEVELOPMENT APPARATUS

**John D. Plumadore, Westfield, Mass., assignor to Scott Paper Company, Philadelphia, Pa.**

**Filed Apr. 8, 1974, Ser. No. 459,193**
**Int. Cl.² G03G** *15/10*
**U.S. Cl. 118—637** **3 Claims**



1. An apparatus for developing an electrostatic latent image on a frame of a larger multi-frame electrophotographic film wherein the photoconductive layer of the film is not discharged to zero in any part of the imaged frame, the apparatus comprising an electrically floating development electrode positioned close to and parallel to the frame being developed and means for providing electrostatically charged toner particles between the development electrode and the frame being developed, the development electrode being no greater than 10% larger in area than the area of the charged frame being developed.

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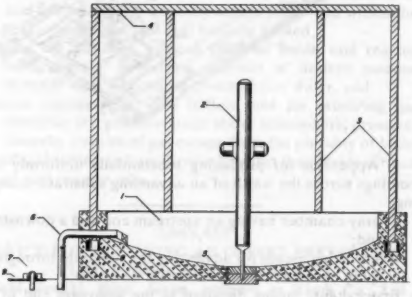
**3,964,437**

## DOG OR ANIMAL TOILET

**Kenneth Jewett Brown, 39 Blackford Ave., Yonkers, N.Y. 10704**

**Filed Dec. 9, 1974, Ser. No. 530,678**
**Int. Cl.² A01K** *29/00*
**U.S. Cl. 119—1** **10 Claims**



1. A dog or animal toilet comprising:

an empty receptacle with a funnel like shape slanting down towards a drain at the bottom for connection to a sewerage disposal system;

a selectively operable flushing system with pipe means delivering water to the receptacle in a centripetal direction, with whirlpool action so as to wash down excrement and to clean and scour its surface;

a control means to activate the flushing system;

a protective barrier for the receptacle;

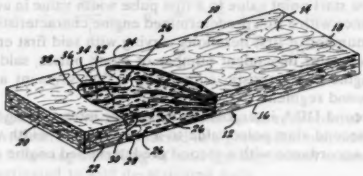
an upright member located over the drain hole for the animals to urinate on and said urine will drain by gravity into the sewerage disposal system and because of the upright member's location over the drain it will prevent the animal from stepping into the drain.

3,964,438

## FOOD BLANKET FOR ANIMALS

Donald James Rodemeyer, City Island, N.Y., assignor to Metaframe Corporation, Elmwood Park, N.J.

Filed June 30, 1975, Ser. No. 591,267
Int. Cl.² A01K 39/00
U.S. Cl. 119—1 7 Claims



1. A food blanket for feeding and nesting an animal, comprising:
a pad of soft, fluffy fibrous material, said pad having at least two plies; and
edible material distributed in said pad between said plies.

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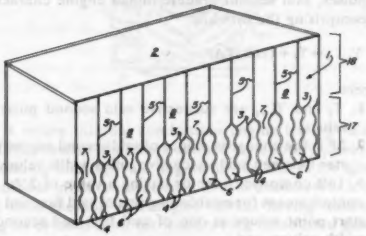
3,964,439

## NON-CLIMBABLE POULTRY CAGE FRONT

Roger L. Fleshman, 10360 W. 74th Place, Arvada, Colo. 80005

Continuation-in-part of Ser. No. 513,992, Oct. 11, 1974, abandoned. This application Nov. 27, 1974, Ser. No. 527,708
Int. Cl.² A01K 31/06
U.S. Cl. 119—17 13 Claims



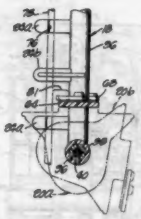
1. A cage front for a poultry cage comprising:
a. a plurality of parallel, spaced cage bars mounted vertically along a side of a poultry cage;
b. each of said bars includes an upper straight stem section and a lower bifurcated section having a pair of generally parallel legs, each of said legs being formed in a back and forth, sinuous configuration, with the curves of each leg arranged to complement the other whereby an alternating series of wide and constricted openings are formed between said legs and
c. said bars are horizontally aligned so that similar wide and constricted openings are formed between the sides of the legs of said bars and wider slotted openings are formed between the stem sections of said bars;
d. the openings between said legs and bars allow poultry of any size to freely feed and water through the front without providing horizontal surfaces which would allow smaller poultry to climb the bars and escape through the wider upper openings.

3,964,440

## POULTRY WATERING DEVICE

Harold W. Hart, Glendale, Calif., assignor to H. W. Hart Mfg. Co., Glendale, Calif.

Division of Ser. No. 342,382, March 19, 1973, Pat. No. 3,870,022. This application Dec. 16, 1974, Ser. No. 532,761
Int. Cl.² A01K 39/02
U.S. Cl. 119—18 13 Claims



1. In securing a poultry drinking cup in a desired position with respect to a wire, the improvement comprising:
means providing a support surface for the poultry drinking cup;
a plurality of wire engaging clips projecting at substantially a right angle from said support surface;
a positioning line on said support surface;
said wire engaging clips being individually positioned with respect to said positioning line on said support surface;
each of said wire engaging clips having a wire contacting surface with each wire contacting surface being generally parallel with said positioning line and in close proximity to said positioning line, and
wire contacting surfaces of adjacent wire engaging clips facing in generally opposite directions,
whereby the wire contacting surfaces of adjacent clips grip opposite sides of the wire when the support surface is brought into contiguous relation with the wire with said wire aligned with said positioning line on the support surface.

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3,964,441

## CANE AND LEASH WINDING ASSEMBLY

Thomas P. Wall, 1551 30th Ave. West, Seattle, Wash. 98199

Filed Apr. 2, 1975, Ser. No. 564,330
Int. Cl.² A01K 27/00
U.S. Cl. 119—109 7 Claims

4. In combination:
a cane
a leash carried by the cane, hook means on one end of the leash for connecting the leash to a ring on a dog collar, and
a reel mounted on the cane and connected to the other end of the leash for paying out and taking up the leash relative to the cane, said reel having a handle for manually turning

the reel and a stop loop arranged to be looped over said handle to prevent turning of the reel.

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**3,964,442**

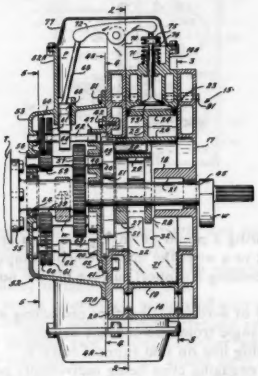
## INTERNAL COMBUSTION ENGINE

**Lee Hunter, 13501 Ladue Road, Creve Coeur, Mo. 63141**

**Filed Feb. 4, 1974, Ser. No. 439,220**

**Int. Cl.² F02B** *55/14*

**U.S. Cl. 123—8.45** **7 Claims**



**1.** An internal combustion engine comprising: a stationary housing defining an annular chamber having a peripheral wall and spaced side face plates, said peripheral wall being formed with recessed flats in circumferentially spaced relation and one of said side face plates being formed with a fixed member located in the axial center of said annular chamber and formed with flat faces presented one to each of said recessed flats, a core member movable in said annular chamber to surround said fixed member, a plurality of crankshafts spaced about said fixed member, each crankshaft having a bearing shaft supported by one of said side face plates, a crank arm extending therefrom and a crankshaft pin on said crank arm and engaged in said core member such that said core member is constrained to move in an orbital path within said annular chamber, partition means in said housing dividing said annular chamber into cells, each partition means extending through said core member and being engaged at one end in a recessed flat and at its opposite end on a flat face and all of said partition means being movable from side-to-side on said flats as said core member orbits in said annular chamber, means to seal said partition means with said recessed flats and said core member and to seal said core member with said side faces, valve means on said housing for each of said cells to admit a combustion medium and exhaust the products of combustion, and power output shaft means driven by all of said crankshafts to transmit power from the combustion medium to the exterior of said engine, said drive shaft means being suppported by said fixed member and the other one of said side face plates.

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**3,964,443**

## DIGITAL ENGINE CONTROL SYSTEM USING DDA SCHEDULE GENERATORS

**Thomas William Hartford, Livonia, Mich., assignor to The Bendix Corporation, Southfield, Mich.**

**Continuation of Ser. No. 363,919, May 25, 1973, abandoned.**

**This application June 7, 1973, Ser. No. 367,990**

**Int. Cl.² F02B** *3/00*; **F02D** *19/10*

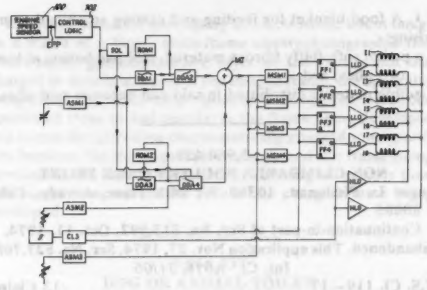
**U.S. Cl. 123—32 EA** **31 Claims**

**1.** An engine control apparatus for controlling an internal combustion engine control device in accordance with a pulsed control signal having an incrementally variable pulse width determined in accordance with a first engine parameter and a second engine parameter, said engine control apparatus comprising:

a. means for generating a first engine parameter dependent number of clock pulses varying with said first engine parameter and a second engine parameter dependent number of clock pulses varying with said second engine parameter;

b. first DDA interpolating means for interpolating from a first start point value to a first pulse width value in accordance with a first predetermined engine characteristic for a number of first iterations varying with said first engine parameter dependent number of clock pulses, said first engine characteristic comprising a first segment and a second segment;

c. second DDA interpolating means for interpolating from a second start point value to a second pulse width value in accordance with a second predetermined engine characteristic for a number of second iterations varying with said second engine parameter dependent number of clock pulses, said second predetermined engine characteristic comprising the formula



$$T_{i+1} = T_i + (1nB)T_i\Delta P,$$

wherein

1. $T_i$ and $T_{i+1}$ are successive said second pulse width values,
2. $\Delta P$ is the change in values of said second engine parameter between said successive pulse width values, and
3. **1nB** comprises a factor having a value of $2^{-n}$;

d. control means for establishing one of said first and second start point values at one of said first and second pulse width values; and

e. utilization means for generating said pulsed control signal in accordance with the other of said first and second pulse width values.

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**3,964,444**

## CONTROL CIRCUIT FOR AN ELECTROMOTOR

**Rainer Hemmann, Markgroningen, and Helmut Steinmann, Baden-Baden, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany**

**Filed Oct. 15, 1974, Ser. No. 515,043**

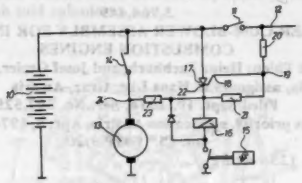
**Claims priority, application Germany, Oct. 19, 1973, 2352525**

**Int. Cl.² F01P** *7/10*

**U.S. Cl. 123—41.49** **9 Claims**

**1.** In a motor vehicle having an engine including an ignition circuit, a source of electric energy, ignition switch means having an activated and a de-activated state for, respectively, connecting and disconnecting said ignition circuit from said source of electric energy, a fan for cooling said engine, an electromotor for driving said fan, and control circuit means for energizing said electromotor independently of said state of

said ignition switch means when said temperature of said engine exceeds a predetermined temperature: limiting means connected to said control circuit means and said ignition



switch means for limiting the operation of said control circuit to a predetermined time period or a predetermined number of times following switching of said ignition switch means from said activated to said de-activated state.

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3,964,445

## WATER COOLING SYSTEM – WANKEL ENGINE

**Robert P. Ernest, Dearborn Heights; Charles M. Jones, Detroit; Edwin J. Ounsted, Dearborn, and Hai Wu, Northville, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.**

**Filed May 3, 1974, Ser. No. 466,652**
**Int. Cl.² F02B 55/10**
**U.S. Cl. 123—8.01** **19 Claims**

1. In a rotary internal combustion engine having variable volume combustion chambers defined by a rotary piston and a surrounding housing, said engine having means for igniting a combustible mixture introduced to said chambers at a combustion zone thereof, said engine further having means for defining an exhaust zone for withdrawing combusted gases, a cooling system for said engine, comprising:

a. at least one flow channel for carrying a cooling medium and extending along an arcuate portion of said combustion chamber,

b. a heat transfer wall separating said flow channel from said combustion chamber and having a smooth surface forming part of said channel, said heat transfer wall extending at least between said combustion zone and said exhaust zone and having a variable thickness therealong which is comprised of a taper at the leading and trailing portions of said wall separated by a uniformly thin section, said wall being so tapered in thickness from a minimum of 0.22 inches at said thin section adjacent said combustion zone to a maximum of at least six times the thin section thickness at said exhaust zone,

c. means in said channel to control said flow therethrough and said passage to insure a controlled flow against said smooth surface of said wall without detachment, and

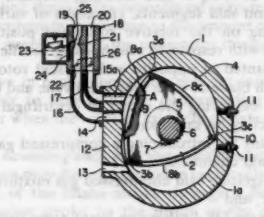
d. means in said channel to disrupt ebullience that may develop along any portion of said wall surface, said system insuring that the operating temperature of said heat transfer wall does not vary greater than 60°F.

3,964,446

## ROTARY PISTON INTERNAL COMBUSTION ENGINE

**Toshiyuki Kohno, Toyoake, and Kenichi Imaizumi, Toyota, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan**

**Filed Jan. 2, 1975, Ser. No. 538,165**
**Claims priority, application Japan, Aug. 27, 1974, 49-97503**
**Int. Cl.² F02B 53/10**
**U.S. Cl. 123—8.13** **2 Claims**



1. A rotary piston engine comprising a rotor housing with a trochoidally shaped inner peripheral wall defining the peripheral wall of a rotary piston chamber, said trochoidally shaped inner wall including a pair of opposed short axis sides, a rotary piston including a plurality of apex seals mounted within said rotary piston chamber for rotation therein in a given direction with said apex seals slidably engaged against said peripheral wall, first port means opening through said peripheral wall at one of said short axis sides, second port means opening through said peripheral wall at the same short axis side thereof as said first port means, air-fuel mixture supply means in flow communication with said first port means for introducing air-fuel mixture therethrough into said piston chamber, and air supply means in flow communication with said second port means for introducing air therethrough into said piston chamber, both said first and said second port means being located on a forward portion of said one short axis side of said inner peripheral wall taken in the direction of rotor rotation, said second port means opening at said one short axis side adjacent said first port means and on a forward side of said first port means taken in the direction of rotor rotation.

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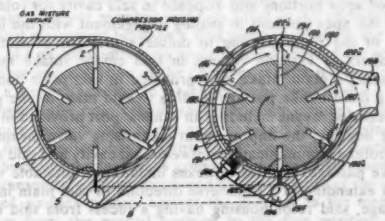
3,964,447

## VANE-TYPE ROTARY INTERNAL COMBUSTION ENGINE

**Michel Normandin, 1328 Nelles, Ste-Foy, Quebec, Canada**

**Filed Aug. 12, 1974, Ser. No. 496,809**
**Int. Cl.² F02B 53/08**
**U.S. Cl. 123—8.41** **15 Claims**



1. In a vane-type rotary internal combustion engine

a motor stage including a motor housing having an interior profile of a first order of configuration with constant diametrical chord,

a rotor rotatably mounted in said housing and including a series of arc-shaped segments disposed in circular align-

ment in said housing and spaced to define therebetween a series of elongated radial openings,

a symmetrical system of unbalanced vanes slidably mounted in said openings and bearing at each extremity against said interior profile, said system including N vanes wherein N is an integer greater than 1, whereby said constant diametrical chord is equal to the length of said vanes, each of said vanes including a pair of blades disposed at 180° with respect to each other,

each vane defining in said housing, between said interior profile and said segments, chambers of variable volume depending on the relative rotational position of each segment with respect to said housing profile,

means mounted at opposite ends of said rotor associated with each blade of each individual vane and in line therewith for balancing the effect of centrifugal and inertial forces acting on said vanes,

intake means for introducing a compressed gas mixture in one of said chambers,

means for igniting said compressed gas mixture in said one chamber, and

exhaust means for discharging burnt gases from another of said chambers.

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**3,964,448**

## ROTARY PISTON TYPE ENGINE

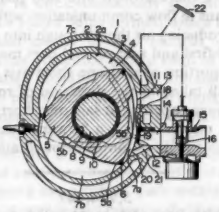
**Masato Eda, Iwata, Japan, assignor to Yamaha, Hatsudoki Kabushiki Kaisha, Japan**

**Filed Dec. 10, 1974, Ser. No. 531,351**

**Claims priority, application Japan, Dec. 12, 1973, 48-140907[U]**

**Int. Cl.² F02G *55/14***

**U.S. Cl. 123—8.45** **8 Claims**



1. Rotary piston type engine comprising a casing which includes a rotor housing having a cavity of multi-lobed profile defined by an inner wall thereof and a pair of side housings gas-tightly secured to the opposite sides of the rotor housing; a multi-lobed rotor having a plurality of circumferentially spaced apex portions and disposed in said cavity for rotation with the apex portions in sealing engagement with the inner wall of the rotor housing to define a plurality of working chambers of variable volume in said cavity; intake means including a main intake port provided in said rotor housing and a main intake passage leading to said main intake port; and exhaust means including an exhaust port provided in said rotor housing; the improvement comprising valve means for controlling communication between said cavity and said main intake passage; said valve means including a rotatable valve shaft extending in a transverse direction of said main intake passage, said rotor housing having a recess from said main intake passage on one side of said main intake passage closely adjacent to said exhaust port; and a valve member connected at one end to said valve shaft and movable to open and close said main intake port, said valve shaft being rotatable to move said valve member between a first position in which said main intake port is closed and a second position in which said main intake port is open, said valve member lying completely in said recess in said second position, whereby said main intake passage is free of any obstruction by said valve means when said valve member is in said second position.

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**3,964,449**

## COOLER-CUM-BLOWER ASSEMBLY FOR INTERNAL COMBUSTION ENGINES

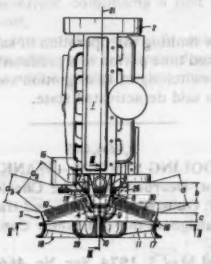
**Gerhard Thien; Heinz Fachbach, and Josef Greier, all of Graz, Austria, assignors to Hans List, Graz, Austria**

**Filed Sept. 19, 1974, Ser. No. 507,525**

**Claims priority, application Austria, Apr. 8, 1974, 2934/74**

**Int. Cl.² F01P *3/20***

**U.S. Cl. 123—41.51** **2 Claims**



1. A cooler-cum-blower assembly in internal combustion engines, in particular for automative engines, comprising a water-cooler including two upright cooler elements located in front of a front end of the internal combustion engine opposite each other in relation to a longitudinal median plane of the engine, each of the cooler elements forming an acute angle with said longitudinal median plane on the side facing away from the engine, an axial blower actuated by the engine and arranged in front of the two cooler elements, said axial blower comprising a blower shaft, a blower impeller mounted thereon, and an outer ring encompassing the blower impeller, further comprising a central bracket attached to said front end of the engine, a bearing for the blower shaft located on the central bracket, an intermediate housing attached to said central bracket and extending from the cooler elements as far as the axial blower, said intermediate housing closing the space between the cooler elements and the blower in an upward and downward direction and comprising a flange on its side facing away from the engine, said outer ring of the blower being attached to said flange.

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**3,964,450**

## ROTARY CAM INTERNAL COMBUSTION RADIAL ENGINE

**John E. Lockshaw, 519 Las Riendas Drive, Fullerton, Calif. 92632**

**Filed Nov. 19, 1973, Ser. No. 417,218**

**Int. Cl.² F02B *75/22***

**U.S. Cl. 123—55 AA** **16 Claims**

1. A rotary-cam, internal-combustion, radial engine, comprising:

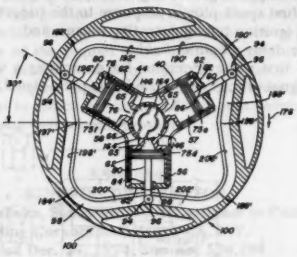
a stationary motor block having a first and a second group of piston cylinders positioned radially outwardly from a centrally disposed longitudinal bore arranged normal to said groups of said cylinders, each of said cylinders including a reduced opening terminating in said central bore;

a first and a second group of pistons operably disposed within respective groups of piston cylinders, each of said pistons including a piston rod extending outwardly from said cylinder;

an explosive chamber within each of said cylinders disposed within the cylinder portion adjacent said longitudinal bore;

a hollow, tubular, drive shaft disposed for rotation within said longitudinal bore;

a fuel-intake system including a fuel-intake means arranged within said tubular drive shaft for operable communication with said cylinders;



an exhaust system including an exhaust means arranged within said tubular drive shaft for operable communication with said cylinders;

a rotatable housing fixedly connected to said drive shaft; and

a cam means secured to said housing and operably attached to each of said piston rods, for operable rotation of said housing and reciprocating movement of said pistons.

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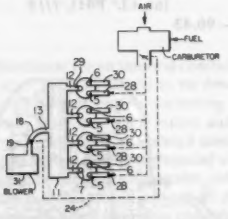
**3,964,451**

## INTERNAL COMBUSTION ENGINE WITH A SUPERCHARGER

**Kenji Goto, Susono, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan**

**Filed Dec. 13, 1973, Ser. No. 424,204**
**Claims priority, application Japan, Aug. 9, 1973, 48-93103**
**Int. Cl.² F02D *33/02***
**U.S. Cl. 123—75 B** **2 Claims**




1. A spark ignition four stroke cycle internal combustion engine of the type that includes a plurality of cylinders, pistons reciprocal in the cylinders; a carburetor having a throttle valve; a cylinder head mounted on the cylinders, said cylinder head having a combustion chamber defined therein for each cylinder, an inlet port leading to each combustion chamber, an intake valve for supplying fuel and air mixture from the carburetor through each intake port, an exhaust port leading from each combustion chamber, and an exhaust valve for exhaust of burnt gas through each exhaust port wherein the improvement comprises:

the carburetor being adjusted to supply a rich fuel and air mixture to the combustion chambers through the intake ports and

supercharging means,

the supercharging means comprising

an air blower for supplying said pressurized intake air,

subordinate ports in the cylinder head opening into each combustion chamber,

an air chamber for temporarily storing said pressurized intake air supplied from said air blower, said air chamber being connected to each of said subordinate ports of said cylinder head,

a vent pipe connecting said air blower and said air chamber,

a regulating valve disposed in said vent pipe, said regulating valve being interconnected with the throttling valve of said carburetor for regulating the amount of pressurized air supplied through the subordinate ports to the combustion chambers in proportion to the amount of fuel and air mixture supplied from the carburetor through the intake ports,

an air valve in each subordinate port for said pressurized intake air to flow into the corresponding combustion chamber when the valve of said subordinate port is open, and

means for actuating each air valve of said subordinate ports to be open only during a period in each cycle from before the end of the intake stroke through a portion of the compression stroke by the piston in the corrsponding cylinder for supplying sufficient additional air under pressure to the combustion chamber for thoroughly mixing with the fuel and air mixture to produce a combustible supercharged lean fuel and air mixture prior to the commencement of the expansion stroke.

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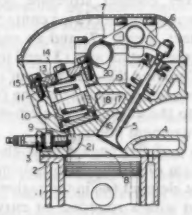
**3,964,452**

## HIGH COMPRESSION INTERNAL COMBUSTION ENGINE USING A LEAN CHARGE

**Norihiko Nakamura, and Toyokazu Baika, both of Susono, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan**

**Filed Sept. 27, 1973, Ser. No. 401,459**
**Claims priority, application Japan, Aug. 4, 1973, 48-87226**
**Int. Cl.² F02B *75/04***
**U.S. Cl. 123—78 AA** **6 Claims**



1. An improved low pollution spark ignition gasoline engine of the type that includes a housing having a chamber defined therein, a power member sealingly fitted in the chamber for cyclical movement between a first position in which the volume of a closed combustion space defined between the power member and a portion of the chamber surface is a maximum and a second position in which said combustion space is a minimum, the ratio betwee said maximum volumes defining the compression ratio of the engine; means for supplying air and fuel in selectable amounts to the combustion space for combustion therein; means connected to the power member for transmitting power developed by the pressure of the combusted air-fuel mixture against the member as the member moves from the second position to the first position; and means forming part of the surface of the chamber portion of the combustion space that is displaceable from a normal position to increase the volume of the combustion space, wherein the improvement comprises:

an engine compression ratio higher than that of a conventional spark ignition engine, in the range of approximately 14 to 17, the means for supplying air and fuel in select-

able amounts being adjusted to produce a lean mixture in the combustion space, and

spring for biasing the displaceable means into the normal position until the pressure of the ignited gases in the combustion space reaches a predetermined value greater than the maximum pressure attained during compression before ignition and for allowing displacement of the displaceable means to prevent the gas pressure from exceeding a predetermined maximum value, the excess energy of said gas being stored by the spring for delivering useful work as the displaceable means returns during each expansion cycle to the normal position, whereby the formation of noxious components in the exhaust gas of said engine is substantially diminished.

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**3,964,453**

## INTERNAL COMBUSTION ENGINE ELECTRIC IGNITION BREAKER CONTACT STRUCTURE

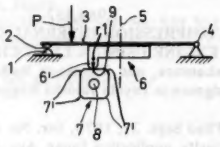
**Harald Kalippke, Hohenacker, and Gunter Brand, Stuttgart, both of Germany, assignors to Robert Bosch G.m.b.H., Gerlingen-Schillerhohe, Germany**

**Filed Oct. 9, 1974, Ser. No. 513,224**

**Claims priority, application Germany, Oct. 9, 1973, 2350562**

**Int. Cl.² H01H *19/62*; F02P *7/02***

**U.S. Cl. 123—146.5 A** **7 Claims**




1. Internal combustion engine ignition apparatus including an ignition breaker contact structure comprising a fixed contact (1), a movable contact (2), a contact arm (3) carrying the movable contact, a cam (7) and an engagement element (6) connected to the contact arm (3) and in engagement with the cam (7), and moving the contact arm (3) between open, and closed position, in dependence on the position of the cam (7) with respect to the engagement element (6),

wherein the improvement comprises

the portion (6′) of the engagement element (6) bearing against the cam (7) comprising polyimide; and

the engagement element (6) in the region engaging the cam (7) is formed with a rounded, or curved surface (9) to engage the cam (7) therewith, said surface (9) being rounded in two transverse directions, the radius of curvature (r1, r2) in the respective directions being selected such that, in operation, wear of said surface, upon engagement of said surface (9) with the cam (7), approximately matches the flattening of the contacts (1, 2) upon repeated opening and closing of the contacts due to movement of the contact arm in dependence on the position of the cam (7) with respect to said engagement element (6).

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**3,964,454**

## DIFFERENTIAL IGNITION TIMING FIRING CONTROL SYSTEM

**Torazo Nishimiya, Mito, Japan, assignor to Hitachi, Ltd., Japan**

**Filed June 21, 1974, Ser. No. 481,825**

**Claims priority, application Japan, July 6, 1973, 45-75679; Sept. 28, 1973, 45-108414**

**Int. Cl.² F02P *3/02*; F02B *75/10***

**U.S. Cl. 123—148 DS** **18 Claims**

1. An ignition timing control system for a reciprocating internal combustion engine having a first spark plug and a second spark plug in each combustion chamber comprising;

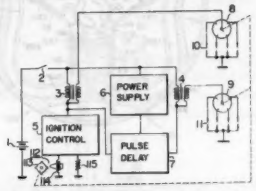
first means for generating an output representative of an operating parameter of the engine;

ignition timing detecting means for generating a trigger signal;

a pulse amplifier generating a first pulse signal for actuating the first spark plug in response to the trigger signal from said ignition timing detecting means; and

a pulse delay amplifier having

a. a first pulse generator for generating a second pulse signal in response to said first pulse signal, said second




pulse signal having a pulse width which is continuously variable substantially in accordance with the output of said first means, and

b. a second pulse generator generating a third pulse signal for actuating the second spark plug in response to the trailing end of the second pulse signal, the initiation of the third pulse signal being delayed from the first pulse signal by the time interval corresponding to the width of the second pulse signal, so that the interval of time between operations of said first and second spark plugs is varied with the variation of the output of said first means.

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**3,964,455**

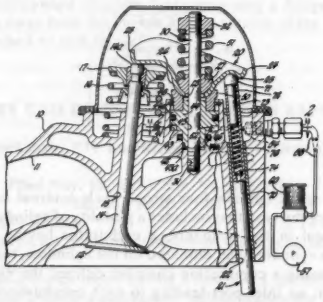
## VALVE CONTROL MECHANISM

**Donald R. Brown, Utica, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Dec. 19, 1974, Ser. No. 534,211**

**Int. Cl.² F01L *1/18***

**U.S. Cl. 123—90.43** **6 Claims**



1. In an internal combustion engine having a cylinder head and reciprocally journalled therein a poppet valve with a return spring connected thereto and a reciprocally driven member for operating the poppet valve in a direction opposed by its spring with each stroke of the member in a direction substantially opposite that of the poppet valve, a rocker for normally transmitting valve operating movement from the member to the poppet valve, said rocker having spaced apart surfaces on one side thereof engageable with oppositely facing surfaces of the member and the poppet valve and a bearing

portion intermediate its ends with a bearing surface on the opposite side of said rocker from said spaced apart surfaces, said bearing portion having an aperture therethrough, support means including a stud extending through said aperture and fixed to said cylinder head, said seat means including a seat movable from a first position at which said seat pivotally journals said bearing surface about the rocking axis of said rocker to a second position at which said rocker is movable to a position at which it is pivotally supported by the oppositely facing surface of the poppet valve and, said support means having power means, including hydraulic actuator means, responsive to engine operating conditions, operably connected thereto to effect movement of said seat between said first position and said second position.

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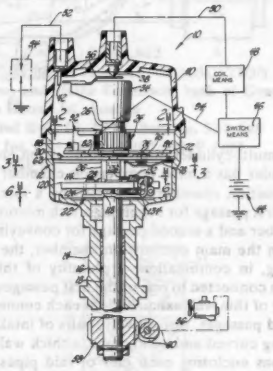
**3,964,456**
**IGNITION DISTRIBUTOR**
**Philip V. Eshelman, Southfield, Mich., assignor to Colt Industries Operating Corporation, New York, N.Y.**
**Filed Dec. 24, 1974, Ser. No. 536,194**
**Int. Cl.² F02D** *5/04*
**U.S. Cl. 123—117 R** **14 Claims**



**1.** An ignition distributor for an internal combustion engine, comprising drive shaft means adapted to be driven in accordance with the speed of said engine, switching rotor means operatively carried by said drive shaft means and effective to cause an opening and closing of associated electrical circuit means, said rotor means being generally coaxial with said shaft means and adapted to be angularly adjustable relative thereto and about the axis of rotation of said drive shaft means, means responsive to changes of engine operating conditions for angularly adjusting said rotor means relative to said drive shaft means, said means responsive to changes of engine operating conditions comprising a single centrifugal weight operatively carried by said drive shaft means and operatively connected to said rotor means, said centrifugal weight being effective to move radially outwardly from said axis of said shaft means in response to rotation of said shaft means and thereby cause said angular adjustment of said rotor means relative to said shaft means, at least first and second spring means located respectively above and below said single centrifugal weight and operatively connected to said single centrifugal weight for resiliently resisting said radially outward movement of said centrifugal weight bearing means having an axis for pivotally securing said single centrifugal weight and for permitting angular rotation of said single centrifugal weight about said axis, said first and second spring means being mounted with respect to each other in a manner so that the lines of resisting forces of said first and second spring means pass through a plane normal to said axis near the center of said bearing means so as to eliminate internal forces related to centifugal force between said drive shaft means and said switching means.

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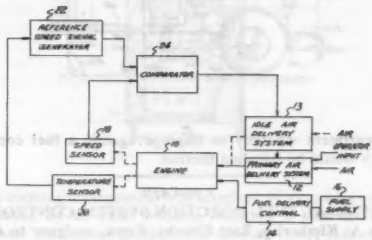
**3,964,457**
**CLOSED LOOP FAST IDLE CONTROL SYSTEM**
**Charles M. Coscia, Columbus, Ohio, assignor to The Bendix Corporation, Southfield, Mich.**
**Filed June 14, 1974, Ser. No. 479,234**
**Int. Cl.² F02D** *1/04, 1/06*
**U.S. Cl. 123—119 F** **10 Claims**




**1.** An idle air delivery system for maintaining the idle speed of an internal combustion engine at a rate determined by the engine temperature comprising:

sensor means generating a speed signal indicative of the actual speed of an internal combustion engine;

sensor means generating a temperature signal indicative of the engine temperature;

reference speed generating circuit means receiving said temperature signal for generating a reference speed signal having a temperature dependent value indicative of an idle speed required to sustain the operation of the engine at the sensed engine temperature;

means comparing said actual speed signal with said reference speed signal for generating a control signal indicative of the change in the idle air flow to the engine to reduce the difference between the actual engine speed signal and the reference speed signal to zero; and

means for controlling the idle air flow to the engine in response to said control signal to change the idle speed of the engine and reduce the difference between said actual speed signal and said reference speed signal to zero.

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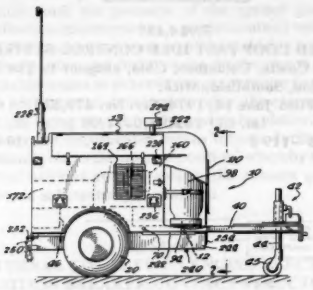
**3,964,458**
**SERVICE VEHICLE FOR MANHOLE OPERATION**
**Robert F. Strauss, Cary, and Carl F. Lawrenz, Skokie, both of Ill., assignors to Service Dynamics, Inc., Lake Bluff, Ill.**
**Division of Ser. No. 229,642, Feb. 28, 1972, Pat. No. 3,799,244. This application Mar. 25, 1974, Ser. No. 454,660**
**Int. Cl.² F02M** *31/00*
**U.S. Cl. 123—122 H** **15 Claims**

**6.** A vehicle for manhole operation and comprising a chassis frame mounting wheels and having means for coupling the same to a truck or the like to be towed thereby, power and powered equipment mounted on said chassis frame and including a liquid cooled prime mover having a radiator for cooling the liquid and a fan blowing air through the radiator, a housing for said vehicle and covering the power and powered equipment, vertical partition means in said vehicle and forming compartments, there being at least one compartment for storing a fuel container for said prime mover and the prime mover in a different compartment, fuel feed means connected between said one compartment and prime mover, said vertical

partition means having structure for selectively directing at least some of the air blown through the radiator into said one



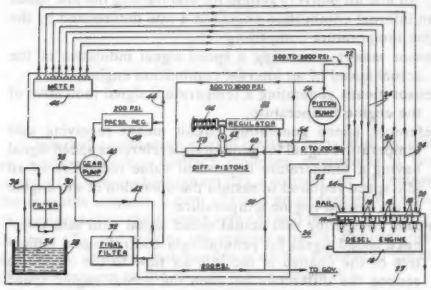
compartment whereby to impinge against a fuel container which would be installed therein.

## 3,964,459

## UNIVERSAL FUEL INJECTION SYSTEM CONTROLLER

John A. Kimberley, East Granby, Conn., assignor to Ambac Industries, Inc., Springfield, Mass.

Filed June 23, 1975, Ser. No. 589,034
Int. Cl.² F02D 11/06
U.S. Cl. 123—140 FG 13 Claims



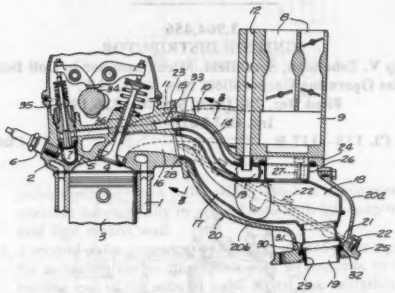

1. A controller for a diesel engine fuel injection system having an injector for each engine cylinder actuated by a variable high pressure fuel common rail, said controller including fuel metering and distributing means for deliverying metered quantities of fuel to said injectors, a high pressure fuel pump for supplying said variable common rail pressure, said common rail output pressure of said pump varying with the fuel input flow thereto, a regulator for regulating the output pressure of said high pressure pump in accordance with engine load, and a low pressure fuel pump for delivering fuel from a fuel supply source to said fuel metering and distributing means and to said regulator for passage into said high pressure pump, said regulator being adapted to sense said common rail output pressure of said high pressure pump and to regulate the flow of fuel into said high pressure pump to thereby vary said common rail output pressure as a function of engine load, said regulator including a regulator sleeve slidably disposed for axial movement within a cylindrical bore, a regulator piston disposed within said sleeve, passage means cooperatively arranged within said regulator sleeve and piston defining a variable orifice for regulating fuel flow through said regulator to said high pressure pump, means for positioning said sleeve within said bore as a function of said high pressure pump common rail output pressure, said latter means comprising differential piston means, and means for positioning said regulator piston within said bore as a function of engine load, whereby the size of said variable orifice is increased or decreased as required to maintain the high pressure pump common rail output pressure at a predetermined level in accordance with engine load.

## 3,964,460

## HEATING OF INTAKE MIXTURE FOR AUXILIARY CHAMBER OF INTERNAL COMBUSTION ENGINE

Soichi Nakano, Kawagoe; Yoshitoku Iizuka, Toda, and Masao Watanabe, Niiza, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha Tokyo, Japan

Filed Nov. 19, 1973, Ser. No. 417,261
Claims priority, application Japan, Dec. 4, 1972, 47-120680
Int. Cl.² F02B 19/10
U.S. Cl. 123—191 S 3 Claims



1. In a multi-cylinder internal combustion engine in which each cylinder has a main combustion chamber and an auxiliary combustion chamber connected by a torch nozzle, and having a first passage for supplying a rich mixture to the auxiliary chamber and a second passage for conveying hot exhaust gases from the main combustion chamber, the improvement comprising, in combination: a plurality of thin wall intake pipes each connected to one of the first passages, respectively, a plurality of thin wall exhaust pipes each connected to one of the second passages, respectively, pairs of intake and exhaust pipes being curved and contiguous, a thick wall housing having portions enclosing each pair of said pipes, each of said intake pipes being integrally connected to a common auxiliary riser enclosed within said housing, and each of said exhaust pipes being integrally connected to a common exhaust chamber enclosed within said housing, the exhaust chamber having an exit pipe projecting through said housing, said housing having a flange provided with a central opening, and means including a bracket spacing the exhaust chamber from the flange, the chamber and the bracket having openings aligned with the central opening in the flange.

## 3,964,461

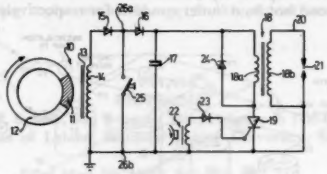
## CAPACITOR TYPE MAGNETO IGNITION SYSTEM WITH DIODE-PROTECTED SHUTDOWN SWITCH

Jürgen Wesemeyer, Nurnberg-Reichelsdorf; Hans Schrumpf, Oberasbach; Werner Meier, Schwabach, and Georg Haubner, Berg, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Nov. 26, 1974, Ser. No. 527,501
Claims priority, application Germany, Dec. 15, 1973, 2362472
Int. Cl.² F02P 1/00, 9/00
U.S. Cl. 123—198 DC 1 Claim

1. In a magneto ignition system for an internal combustion engine comprising a capacitor (17) arranged to be charged in a half-wave rectifier circuit through a charging diode (15) by a magneto generator (10) having an armature winding connected to said circuit, a controllable switching element (19) under control of ignition timing means (22) arranged for discharging said capacitor at the timed ignition moment through a transformer (18) that feeds at least one sparkplug (21) and also a shutdown switch (25) bridging the capacitor

charging circuit, the improvement constituted by the provision of an additional diode (16) in series with said charging diode (15), said charging diode being a diode element of a half-wave rectifier circuit which is the only rectification circuit with said armature winding of said magneto generator, and the connection of said shutdown switch (25) between the common connection (26*a*) of said diodes and the connection (26*b*) of said magneto generator remote from said generator.



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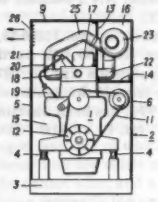
3,964,462

## SOUND-PROOFED INTERNAL COMBUSTION ENGINE

Gerhard Thien, and Heinz Fachbach, both of Graz, Austria, assignors to Hans List, Austria

Filed Dec. 10, 1974, Ser. No. 531,445
Int. Cl.[2] F02B 77/00; F01P 1/02
U.S. Cl. 123—198 E 3 Claims



1. An internal combustion engine having a soundproofing casing therearound and defining a chamber therebetween through which air is circulated from a blower mounted adjacent to an inlet opening in a first front wall of the casing to remove generated heat from the engine, the improvement in which compirses

at least one partition wall dividing the chamber into two separate cooling air ducts which are sealed from each other,

a first one of the cooling air ducts containing all fuel carrying parts of the engine including a fuel injection pump, fuel pressure pipes and fuel injection nozzles,

the second one of the cooling air ducts containing at least the major portions of those components of the engine exhaust system which are located within the soundproofing casing including an exhaust manifold and an exhaust tube, and

the soundproofing casing having two separated cooling air outlet ports therein each of which is connected to a separate one of the two cooling air ducts whereby any combustible materials carried by the cooling air from the fuel carrying parts of the engine are prevented from encountering hot exhaust system surfaces thereby significantly reducing any danger of fire.

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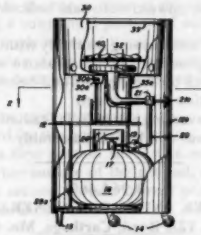
3,964,463

## OUTDOOR COOKING ARRANGEMENT

Donald E. Dailey, Evansville, Ind., assignor to Arkla Industries, Inc., Evansville, Ind.

Continuation of Ser. No. 253,447, May 15, 1972, abandoned.
This application May 28, 1974, Ser. No. 473,872
Int. Cl.[2] A47J 37/00; F24C 3/00
U.S. Cl. 126—41 R 5 Claims



1. A cooking arrangement characterized by a cooking vessel surrounded by an outer housing including a base member proximate the bottom thereof, said cooking vessel defined by a side and a bottom, a source of fuel disposed above said base member within said outer housing, control means for said source of fuel, a plate member disposed within said outer housing and mounting said cooking vessel, a burner within said cooking vessel communicating through an opening in said bottom of said cooking vessel with said source of fuel, and a cooking grid positioned above said burner within said cooking vessel, said outer housing being spaced apart from said side of said cooking vessel to define a blanket of insulating neutral air.

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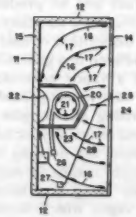
3,964,464

## SOLAR RADIATION COLLECTOR AND CONCENTRATOR

Vernon J. Hockman, Oak Ridge, Tenn., assignor to Oak Ridge Solar Engineering, Inc., Oak Ridge, Tenn.

Filed Apr. 8, 1975, Ser. No. 566,104
Int. Cl.[2] F24J 3/02
U.S. Cl. 126—270 6 Claims



1. A solar radiation collector and concentrator comprising:

a. an enclosure assembly formed from weatherproof metal and defining a generally rectangular mounting surface;

b. a transparent cover portion for said enclosure assembly;

c. a longitudinal plurality of aligned curved reflective surfaces supported within said mounting surface and being operable to reflect incident solar radiation toward a common focal axis extending longitudinally of said enclosure assembly;

d. multiple vertical reflectors positioned perpendicular to said plurality of longitudinal aligned curved reflective surfaces and being operable to reflect low-angle solar radiation toward said common focal axis;

e. a helicoidal fluid-bearing tube longitudinally mounted within said enclosure assembly and being positioned at the common focal axis of solar radiation reflected from said longitudinal plurality of aligned curved reflective surfaces and at the common focal axis of low-angle solar radiation reflected from said multiple vertical reflectors;
f. a convex radiation reflector longitudinally mounted below and along an axis parallel to said helicoidal fluid-bearing tube and being operable to reflect incident and low-angle solar radiation upward onto said helicoidal fluid-bearing tube;
g. a transparent coil housing assembly within said enclosure assembly longitudinally mounted above and along an axis parallel to both the helicoidal fluid-bearing tube and the convex radiation relector; and
h. means for preventing excess solar radiation from striking said transparent coil housing assembly.

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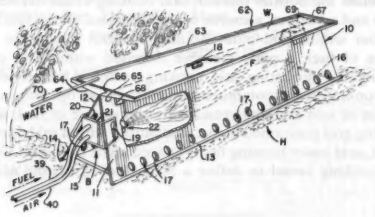
## 3,964,465
## HEATER AND VAPOR GENERATOR

**Richard E. Diggs, 12A Road, Carthage, Mo. 64836**

**Filed May 7, 1975, Ser. No. 575,231**
**Int. Cl.² F24H *1/34***
**U.S. Cl. 126—350 B** **8 Claims**




1. A heater for warming crops such as fruit trees and vineyards and the like comprising an elongate housing having inclined side walls and opposite open ends; a burner means supported in the housing at one end thereof; air supply means and fuel supply means connected with the burner means to supply fuel and air thereto; said burner means having air and fuel outlet orifice means arranged to produce atomized fuel spray and obtain efficient and substantially pollution free combustion of the fuel and to produce a turbulent flame within the housing extending substantially the length of the housing; the angular disposition of said side walls being such that radiant heat is radiated in a generally horizontal direction onto the crops; and a vapor generator and heat reflector supported on top of said housing, said vapor generator and heat reflector comprising an elongate, shallow tray having opposite, upwardly and outwardly inclined bottom surfaces to reflect heat rising from the housing outwardly toward the crops, and water supply means to supply water to the tray whereby the upwardly rising heat heats the water and produces a quantity of vapor which forms a blanket of fog to retain the heat near the ground.

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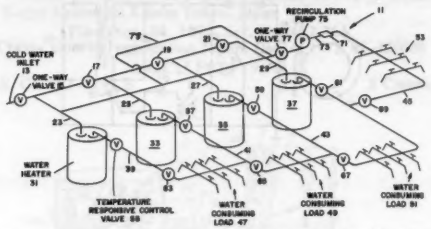
## 3,964,466
## PARALLEL FLUID HEATING SYSTEM

**Jack G. Ohringer, 175 Rodgers, Vallejo, Calif. 94590**

**Filed Mar. 31, 1975, Ser. No. 563,910**
**Int. Cl.² F24H *1/00***
**U.S. Cl. 126—361** **7 Claims**

1. A parallel fluid heating system comprising:
a. at least first and second fluid heaters;
b. at least one load that consumes heated fluid;
c. at least first and second cold fluid inlet conduits respectively connected to the inlets of said at least first and second fluid heaters;
d. at least first and second hot fluid outlet conduits respectively connected to the outlets of said first and second fluid heaters;
e. said at least first and second hot fluid outlet conduits being connected to said at least one load;
f. at least first and second temperature responsive control valves respectively positioned in said at least first and second hot fluid outlet conduits for respectively controlling the hot fluid flow rate therein in response to the temperature of the hot fluid contained therein; and
g. each of said at least first and second temperature responsive control valves are open when said fluid temperature is above a first predetermined value and closed when said fluid is below a second predetermined value and said first predetermined value being greater than said second predetermined value.

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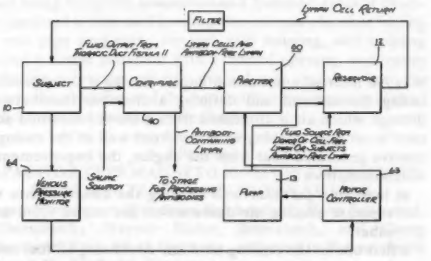
## 3,964,467
## METHODS AND APPARATUS FOR AUGMENTATION OF THE PRODUCTION OF ANTI-BODIES IN ANIMALS AND HUMANS AND THE COLLECTION THEREOF

**Sam Rose, Eggertsville, N.Y., assignor to BIO Response Inc., Scarborough, N.Y.**

**Continuation-in-part of Ser. No. 328,048, Jan. 30, 1973, which is a division of Ser. No. 136,476, April 22, 1971, Pat. No. 3,179,182. This application Apr. 9, 1973, Ser. No. 349,330**
**The portion of the term of this patent subsequent to Mar. 6, 1990, has been disclaimed.**
**Int. Cl.² A61B *19/00***
**U.S. Cl. 128—1 R** **45 Claims**




1. A method for the augmentation of production of a specific antibody from a patient which comprises:
selecting a patient making antibodies to a specific antigen selected from the group consisting of endogenous and non-administered exogenous antigens;
performing a thoracic duct fistula on the patient;
raising the patient's central venous pressure to a preselected level to eliminate alternate lymphatico venous channels;
collecting lymph from said fistula;
centrifuging said collected lymph to separate the lymph cells therein from the lymph fluid and to form a thin elongated layer of cells;

treating said thin elongated layer of lymph cells to assure that they are substantially free of the antibody produced by the patient in response to said specific antigen;

dispersing said cells in a physiologically balanced saline solution;

returning said dispersed cells and solution to the patient; and

providing replacement therapy to the patient intravascularly.

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**3,964,468**

## BIOPTOME

**Werner P. Schulz, San Bruno, Calif., assignor to The Board of Trustees of Leland Stanford Junior University, Stanford, Conn.**

**Filed May 30, 1975, Ser. No. 582,210**
**Int. Cl.² A61B** *5/00, 17/32, 17/28*
**U.S. Cl. 128—2 B** **6 Claims**

1. In a bioptome comprising: tongs; a rotational joint socket mounted on the working end of one of the legs of the tongs; a rigid tubular barrel mounted at one of its ends to the working end of the other leg of the tongs; an elongated flexible spiral wire catheter attached at one of its ends to the other end of said barrel; an elongated center wire that extends axially through the bores of said barrel and said catheter and has a joint on its one end that is received in said socket; a seal between the center wire and the catheter at each end of the catheter; a pair of hinged jaws one of which is mounted on the other end of the catheter and the other of which is attached to the other end of the center wire; and a heat-shrunk plastic sleeve about the catheter that seals the radial exterior surface of the catheter and prevents the catheter from substantial axial expansion, the improvement comprising: a heat-shrunk plastic inner sleeve about the barrel and a segment of the catheter that together with said sleeve forms a double sleeve about said barrel and said segment, the end of the inner sleeve that is about the segment being bias-cut.

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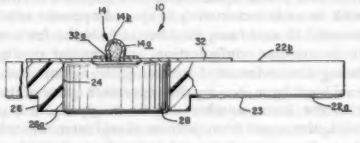
**3,964,469**

## DISPOSABLE ELECTRODE

**Arthur G. Manley, Andover, Mass., assignor to Eastprint, Inc., Andover, Mass.**

**Filed Apr. 21, 1975, Ser. No. 570,077**
**Int. Cl.² A61B** *5/04*
**U.S. Cl. 128—2.1 E** **7 Claims**




1. A medical electrode comprising

A. a flexible support layer having a top surface and an adhesive bottom surface,

B. means defining a through opening in the support layer extending between its top and bottom surfaces,

C. a flexible, resilient collar

1. projecting from the bottom surface of the support layer, and

2. surrounding said opening,

D. a thin nonporous sheet

1. adhered to the top surface of the support layer, and

2. covering a substantial portion of said opening,

E. a gel pad snugly received in said opening and collar, said gel pad having a top surface contacting the nonporous sheet and a bottom surface exposed at the rim of said collar, and

F. a conductive contact element

1. supported by the nonporous sheet,

2. having a first portion thereof in conductive contact with the top surface of the gel pad, and

3. having a second portion thereof projecting above the nonporous sheet.

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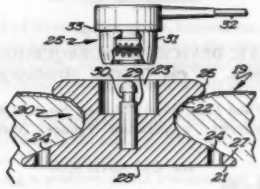
**3,964,470**

## PERCUTANEOUS INTRADERMAL ELECTRICAL CONNECTION SYSTEM AND IMPLANT DEVICE

**Michael A. Trombley, Minneapolis, Minn., assignor to Medtronic, Inc., Minneapolis, Minn.**

**Filed July 25, 1974, Ser. No. 491,785**
**Int. Cl.² A61B** *5/04;* **A61N** *1/36*
**U.S. Cl. 128—2.1 E** **24 Claims**




1. In a percutaneous electrical connection system of the type having a conductive lead, having an implant device including a flange and a neck extending from the flange a sufficient distance to pass an end thereof through the skin, the neck being provided with a cavity in said end and said implant device including an electrical conduction path from its neck cavity to at least one location at the surface of its flange, and having means for operatively connecting said lead to said implant device, the improvement wherein said connecting means includes first and second means for releasably establishing a mechanical and electrical connection between said lead and said implant device conduction path while allowing said lead to rotate through 360° relative to said implant device, said first means being secured within said cavity in electrical communication with said implant device conduction path and said second means being secured to said lead in electrical communication therewith.

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**3,964,471**

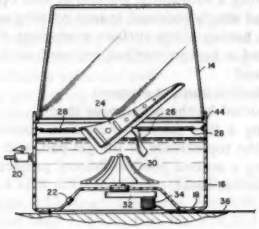
## CHILD'S BATHING CABINET

**Magnus Saethre, Brooklyn, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest**

**Filed June 16, 1975, Ser. No. 587,368**
**Int. Cl.² A61H** *9/00*
**U.S. Cl. 128—65** **2 Claims**

1. A bathing cabinet for children comprising a base member which includes a continuously extending closed wall section having a floor element joined to the lower extremity thereof, a dome member consisting essentially of a side wall portion

and a top enclosure supported by the upper portion of said wall section, at least a substantial segment of said side wall portion of said dome being constructed so as to provide visual access to the interior of the cabinet, seating means being positioned within the cabinet within full view of the transparent segment of said dome, water inlet and outlet means connected to said base member for supplying water thereto and for draining water therefrom, water agitator means mounted within said base member, and means for imparting movement to said agitator means.



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**3,964,472**

**AUTOMATIC DEVICE FOR SUBAQUEOUS MASSAGE**

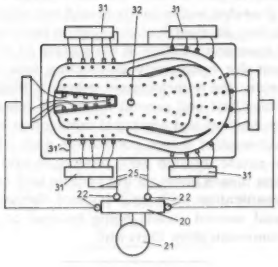
**Michel Nicollet, 6, rue Oberlin, Strasbourg, (Bas-Rhin), France**

**Filed Mar. 20, 1974, Ser. No. 452,840**

**Claims priority, application France, Mar. 20, 1973, 73.11007**

**Int. Cl.[2] A61H 9/00**

**U.S. Cl. 128—66** **15 Claims**



**1.** An automatic device for underwater massage, comprising a tub specially shaped to place a human body in a relaxing position, a motor-driven pump recycling water in a closed circuit in the tub through a dispatching system comprising a general water distributor manifold at the outlet of the pump, said manifold being connected to several secondary distributor manifolds, each of said secondary manifolds feeding water to several water outlets located in the walls of the tub.

**3,964,473**

**BONE PROSTHESIS**

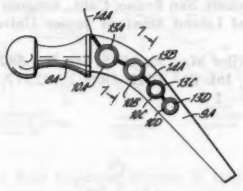
**Geoffrey Gordon Wickham, and Allen Frederick Dwyer, both of Sydney, Australia, assignors to Telectronics Pty. Limited, New South Wales, Australia**

**Filed Sept. 19, 1973, Ser. No. 398,880**

**Claims priority, application Australia, Sept. 21, 1972, 516/72**

**Int. Cl.[2] A61N 1/00; A61F 1/04**

**U.S. Cl. 128—82.1** **2 Claims**



**1.** A bone prosthesis comprising a core, said core including a head and a shaft, said shaft defining a hole pierced therein, a keying electrode substantially lining the surface of said hole and an insulating layer disposed between the core and electrode securing each to each whereby said electrode includes key formations into which bone may grow for locking engagement therewith.

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**3,964,474**

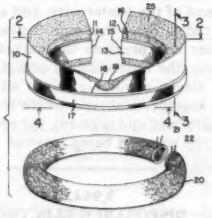
**UNIVERSAL CERVICAL COLLAR**

**J. DeWitt Fox, 1894 Carla Ridge, Beverly Hills, Calif. 90210**

**Filed May 27, 1975, Ser. No. 580,926**

**Int. Cl.[2] A61F 5/04**

**U.S. Cl. 128—87 B** **7 Claims**

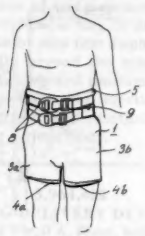


**1.** A cervical collar comprising, in combination:

a. a plastic foam member curved into an annular shape with its ends terminating in the rear in spaced opposed relationship; and,

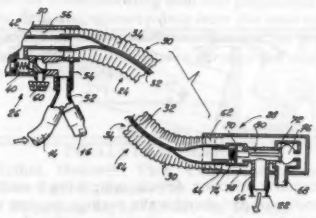
b. at least one band of resilient plastic material different from said plastic foam biased into a desired annular shape with its ends terminating in spaced opposed relationship secured to said foam member to hold the foam member in its annular configuration, said annular configuration being circumferentially expandable against the bias of said band by increasing the separation space of its ends so that the foam member will fit snugly about a person's neck, the upper front portion of said member including a front depression for receiving and comfortably cradling the forward under portion of a patient's jaw.

3,964,475
**PROTECTING HOSE**
Anna-Lisa Holm, Prologgatan 14, 42241 Hisings-Backa Goteborg, Sweden
Filed May 17, 1974, Ser. No. 471,017
Int. Cl.² A61F 13/00
U.S. Cl. 128—132 R 1 Claim



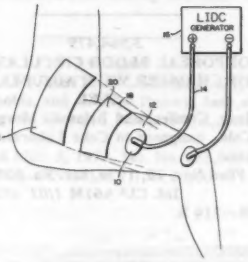

1. Protecting pants intended to insulate in a water and a gas proof manner a body portion of a person wearing said pants from the medium surrounding him comprising pants being made from an elastical, liquid and gas proof and heat insulating material, said pants having legs with the lower portions of said pant legs being provided with inwardly folded cuffs made from a thin and pliable material such as rubber, wherein said cuffs are capable of forming a tight connection between the thighs of the wearer and said pants in the inwardly folded position of said cuffs, said pants having a waist portion having an inflatable zone extending all around said waist portion, an adjustable strap assembly, said strap assembly extending around said inflatable zone of said waist portion to press said inflatable zone of said pants against the waist of the wearer.

3,964,476
**RESPIRATION SYSTEM AND DEVICE**
Roberto Palleni, 18, Villaggio Aurelia, 20060 Cassina de' Pecchi, Italy
Filed Nov. 5, 1974, Ser. No. 521,148
Claims priority, application Italy, Nov. 5, 1973, 30902/73
Int. Cl.² A61M 16/00
U.S. Cl. 128—145.6 10 Claims



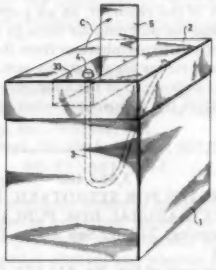
1. In a device for administering a gaseous medium from a remotely located source to a patient, a combination, comprising elongated, bendable but shape-retaining tubular means having one end arranged adjacent the patient and its other end spaced therefrom and adapted to communicate with said source, said tubular means including an inner, flexible collapsible first tube bounding an interior space and an outer, bendable but shape-retaining second tube surrounding said first tube and defining a pumping chamber therewith; inlet means at said other end and having an inlet port in communication with said source of gaseous medium to be conveyed to the patient and with said interior space; outlet means at said one end communicating with said interior space and having an outlet port adapted to be in communication with the patient; and pumping means in communication with said pumping chamber and with an alternately-cycled source of pressurized medium for intermittently compressing said flexible first tube and thereby pumping during each compression a quantity of the gaseous medium therein via said inlet means towards said outlet means and from there to the patient.

3,964,477
**METHOD OF USING ELECTRODES HAVING ANTISEPTIC PROPERTIES FOR LIDC THERAPY**
Franklin H. Ellis, and Stephen W. Andrews, both of Rochester, N.Y., assignors to Sybron Corporation, Rochester, N.Y.
Filed Jan. 30, 1975, Ser. No. 545,609
Int. Cl.² A61N 1/00
U.S. Cl. 128—172.1 2 Claims




1. A method of treating skin ulcers, lacerations, wounds and the like, wherein said method comprises the steps of:
a. maintaining a first side of a silver-silver choride bearing porous electrode in substantially direct contact with the skin;
b. providing an electrolyte solution on the second side of said electrode so that said electrolyte is carried through the porous electrode; and
c. maintaining a positive direct current flow through said electrode so that said electrode is an anode.

3,964,478
**INHALER APPARATUS**
Georg Kropfhammer, Seebruck, Germany
Filed July 19, 1974, Ser. No. 489,898
Int. Cl.² A61M 16/00
U.S. Cl. 128—203 22 Claims



1. An inhaler apparatus comprises a housing and a breathing system mounted within said housing;
said breathing system includes a source of gas, an applicator for said gas, a feed hose connected between said source and said applicator, and valve means for controlling the flow of said gas to said applicator;

said housing includes a lid which is movable between an open position in which said applicator can be withdrawn from said housing and a closed position which prevents access to said applicator;

locking means to hold said lid in said closed position, and unlocking means to disengage said locking means;

timer means connected to said valve means for actuating said valve means for a predetermined period of time;

actuating means connected to said timer means for actuating said timer means; and

connecting means connecting said lid and said timer means, said connecting means including a shaft fixedlly connected to said lid; a first member fixedly connected to said shaft and extending radially outwardly therefrom, and first lever means connected between said first member and said actuating means whereby when said lid is moved into an open position said timer means actuates the valve means and thereby communicates the source with the applicator for said predetermined period time.

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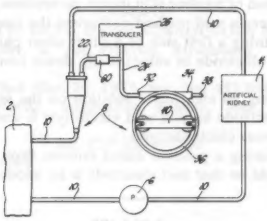
**3,964,479**

## EXTRACORPOREAL BLOOD CIRCULATION SYSTEM AND DRIP CHAMBER WITH ADJUSTABLE BLOOD LEVEL

**James T. Boag, Conifer, and Brian E. Morgan, Wheatridge, both of Colo., assignors to Cobe Laboratories, Inc., Lakewood, Colo.**

**Filed Nov. 20, 1974, Ser. No. 525,426**
**Int. Cl.² A61M *1/03***
**U.S. Cl. 128—214 R** **3 Claims**




1. An extracorporeal blood circulation system comprising tubing for conducting blood to and from a patient and including a chamber having a blood inlet at the top thereof and a blood outlet at the bottom thereof, said chamber during operation containing blood in its bottom portion and air in its top portion, an air passage communicating at one end thereof with the top portion of the chamber, an air pump communicating with said passage for pumping air through said passage from the chamber into the atmosphere or from the atmosphere into the chamber, and means for selectively actuating the pump to either pump air into or out of the chamber, said pump sealing said chamber from the atmosphere when said pump is not in operation.

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**3,964,480**

## APPARATUS FOR STEROTAXIC LATERAL EXTRADURAL DISC PUNCTURE

**Edward C. Froning, 215 N. San Mateo Drive, San Mateo, Calif. 94401**

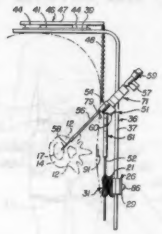
**Continuation-in-part of Ser. No. 511,655, Oct. 3, 1974. This application Apr. 21, 1975, Ser. No. 569,867**
**Int. Cl.² A61M *5/00*; A61B *17/00***
**U.S. Cl. 128—215** **9 Claims**

1. Apparatus for lateral extradural disc puncture comprising a bridge adapted to be fixed in position along the back of the patient parallel to and below the spinous processes,

at least one frame having a first stretch and a second stretch angularly related to said first stretch,

cooperating first means on said bridge and said first stretch for adjustably positioning said frame vertically and horizontally relative to said bridge so that said second stretch overlies the patient,

a stem,



an cannula angle guide connecting said stem relative to said bridge to determine the position of said cannula angle guide both from the midsagittal plane of the patient and longitudinally relative to the intervertebral discs of said patient,

a heading guide,

cooperating third means adjustably positioning said heading guide relative to said second stretch substantially horizontally and longitudinally relative to said patient.

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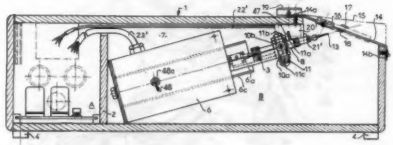
**3,964,481**

## AUTOMATIC INJECTION DEVICE

**Albert Joseph Gourlandt; Georges Charles Gourlandt, both of Les Gresillons, 78750 Gambais; Yves Bernard Cauquelin, 1, Square Montmorency, Residence Auteuil, 78150 Le Chesnay Parly 2, and Jean Francois Lafon, Moulin de Fourcon, Saint-Germain-les-Arpajon, 91290 Arpajon, all of France**

**Continuation-in-part of Ser. No. 349,979, April 11, 1973, abandoned. This application Sept. 23, 1974, Ser. No. 508,447**
**Claims priority, application France, Apr. 28, 1972, 72.15380; July 3, 1974, 74.23153**
**Int. Cl.² A61M *5/00***
**U.S. Cl. 128—218 A** **16 Claims**



1. Automatic injection device comprising a casing formed by a plurality of peripheral walls, syringe support means rigidly mounted in said casing, an injection syringe located within said casing and including a syringe body slidably mounted on said syringe support means and provided with a lateral injection-liquid supply tubulure, a syringe piston provided with a piston rod and adapted to slide in said syringe body, and an injection needle rigidly secured to said syringe body, retention means for immobilizing a part of an animal to be treated, said retention means comprising at least one retention plate formed by one of said peripheral walls and having an external surface which is a part of the outer surface of the casing, and at least one stop member rigidly secured to said retention plate and extending outside of said casing, parallel to and in contact with a part of the external surface of said retention plate, said stop member having a plane elongated main abuutment face and at least one auxiliary abutment face, each face

being substantially perpendicular to said retention plate and being angularly related one to the other, first displacement means for advancing and withdrawing the syringe body, at each injection, with respect to said retention means, and piston displacement means for displacing said piston with respect to said syringe body, said retention plate being provided with an aperture which opens at a point located close to said main abutment face and in the vicinity of said auxiliary abutment face, on a part of the external surface of said retention plate which is clear of said stop member, through which aperture said injection needle may be displaced with respect to said retention plate by said first displacement means so as to protrude outwardly beyond the external surface of the retention plate in the advanced position of the syringe body thereby enabling injection, said injection needle being inwardly disposed relative to said external surface in the withdrawn position of the syringe body.

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**3,964,482**

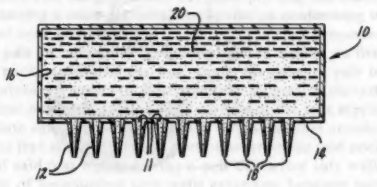
**DRUG DELIVERY DEVICE**

**Martin S. Gerstel, and Virgil A. Place, both of Palo Alto, Calif., assignors to Alza Corporation, Palo Alto, Calif.**

**Filed May 17, 1971, Ser. No. 144,061**

**Int. Cl.² A61M 7/00**

**U.S. Cl. 128—260** **1 Claim**




1. A drug delivery device for percutaneously administering a drug comprising,

a. a plurality of puncturing projections, formed of a drug release rate controlling material permeable to passage of a drug by diffusion, and

b. a reservoir communicating with said projections containing the drug and whereby drug from the reservoir enters the projections and by diffusion through the projections is percutaneously administered through the stratum corneum of the epidermis.

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**3,964,483**

**INHALATION DEVICE**

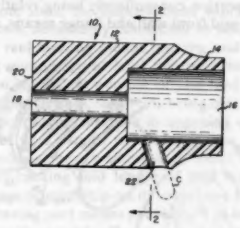
**Stanley Mathes, Mountain View, Calif., assignor to Syntex Puerto Rico, Inc., Humacao, P.R.**

**Filed Jan. 13, 1975, Ser. No. 540,623**

**Int. Cl.² A61M 13/00**

**U.S. Cl. 128—266** **16 Claims**

1. An inhalation device for dispensing a medicament from a medicament-holding container comprising an elongate housing having a passageway for the movement of air therethrough, one end of said housing being an output end adapted for insertion into the mouth or nasal passages of a user thereof; said passageway terminating in an emptying chamber located adjacent the output end of said housing, the cross-sectional area of said passage-way being less than the cross sectional area of said emptying chamber; and means extending through a side wall of said housing from the outside and opening into said emptying chamber for receiving a medicament-holding container, said container receiving means being tilted at an angle toward said passageway, whereby, during inhalation, a component of the air flowing through said passageway flows into the container receiving means whereby the medicament held in a medicament-holding container is dispensed therefrom.

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**3,964,484**

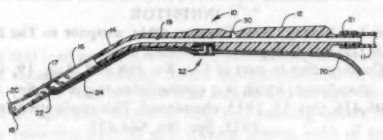
**ANTICOAGULANT METERING DEVICE AND METHOD**

**Gordon S. Reynolds, and A. Boyd Hansen, both of Bountiful, Utah, assignors to Sorenson Research Co., Inc., Salt Lake City, Utah**

**Filed Mar. 3, 1975, Ser. No. 555,008**

**Int. Cl.² A61M 1/100, 27/00**

**U.S. Cl. 128—276** **11 Claims**



1. A blood aspiration wand assembly for metering anticoagulant to aspirated blood comprising:

an elongated wand comprising a perforated suction tip and an interior passageway which is selectively evacuated to accommodate aspiration of blood at the tip and displacement of the blood through the passageway toward a receiving container;

conduit means for carrying anticoagulant from a source to the passageway;

valve means interposed in the conduit means; and

means communicating the passageway with the valve means, the valve means comprising means displaceable between open and closed positions responsive to changes in pressure in the passageway communicated to the valve means through the communicating means for metering the quantity of anticoagulant passing through the conduit.

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**3,964,485**

**ENTEROSTOMY APPLIANCES**

**Erich Neumeier, Mosinee, Wis., assignor to Marsan Manufacturing Company, Inc., Wausau, Wis.**

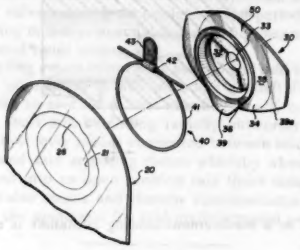
**Filed Sept. 20, 1974, Ser. No. 507,734**

**Int. Cl.² A61F 5/44**

**U.S. Cl. 128—283** **6 Claims**

1. In an ostomy appliance assembly including a gasket element, a waste material collection pouch and flexible band means for releasably securing the collection pouch in sealed relation with the gasket element and wherein the gasket element includes a gasket body having operative front and back walls, the operative front wall including an outwardly-extending flange means for attachment and support of the collection pouch and the operative back wall including an outwardly-extending convex portion with a centrally disposed stoma-accommodating opening therein, an improvement in the gasket element comprising:

a gasket front wall and flange means composed of a material having a hardness greater than that of the material of which said back wall convex portion is composed, said convex portion consequently being relatively more flexible than said front wall and flange means, and wherein the



surface of said gasket body front wall adjacent said flange means is substantially planar and said flange means is frusto-conical in shape, having an outer surface forming an acutely angled circumferential groove with said gasket body planar front wall surface.

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**3,964,486**

## DISPOSABLE DIAPER CONTAINING AMMONIA INHIBITOR

**Ted Lee Blaney, West Chester, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio**

**Continuation-in-part of Ser. No. 498,497, Aug. 19, 1974, abandoned, which is a continuation-in-part of Ser. No. 406,426, Oct. 15, 1973, abandoned. This application Jan. 27, 1975, Ser. No. 544,471**

**Int. Cl.² A61F *13/16***

**U.S. Cl. 128—284** **8 Claims**

1. In a disposable diaper comprising an absorbent core, a topsheet superposed or co-extensive with one face of said core, and a liquid impervious backsheet superposed or co-extensive with the face of said core opposite the face covered by said topsheet, the improvement comprising incorporating therein from about 0.5 to about 4.0 grams of adipic acid.

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**3,964,487**

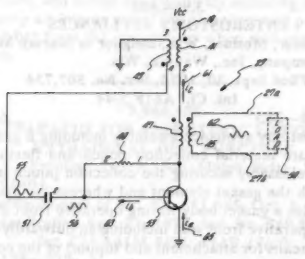
## UNCOMPLICATED LOAD-ADAPTING ELECTROSURGICAL CUTTING GENERATOR

**Donald W. Judson, Simi Valley, Calif., assignor to The Birtcher Corporation, Los Angeles, Calif.**

**Filed Dec. 9, 1974, Ser. No. 530,701**

**Int. Cl.² A61N *3/00***

**U.S. Cl. 128—303.14** **13 Claims**



1. In an electrosurgical device having a power supply, a cutting signal generator driven by said power supply, and switching means for selecting the output signal of said generator for supply to a varying impedance cutting electrode load, the improvement therein being a cutting signal generator comprising:

amplifier means having an input and output circuit for supplying an output current in its output circuit which varies inversely with the impedance variation of said load; and

means coupling the output current variation of said amplifier means to the input circuit of said amplifier means for causing said amplifier means to controllably reinforce the current variation in its output circuit.

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**3,964,488**

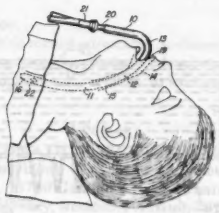
## TRACHEAL TUBE

**Wallace H. Ring; John C. Adair, and Richard A. Elwyn, all of Salt Lake City, Utah, assignors to Wallace H. Ring, Salt Lake City, Utah**

**Filed Nov. 13, 1974, Ser. No. 523,250**

**Int. Cl.² A61M *16/00***

**U.S. Cl. 128—351** **10 Claims**



1. A preformed, flexible, elongate, tracheal tube made of flexible material having a memory so said tube will return to its preformed shape following flexure, comprising a proximal or machine end portion of the length of the tube having its terminal end open and adapted for connection with a source of gas to be introduced into the lungs of a patient; a distal or patient end portion of the length of the tube having its terminal end portion open and beveled; an intermediate portion of the length of the tube; and a preformed abrupt bend portion of the length of the tube; said distal or patient end portion and said intermediate portion merging into each other along the length of the tube and including curvature such they will positionally conform approximately to the shape of a patient 's posterior pharynx and trachea and extend therealong when said tracheal tube is installed for use, and said bend portion interconnecting said proximal or machine end portion and said intermediate portion along the length of the tube at an angle substantially no greater than 90° so said proximal or machine end portion will be located exteriorly of the body opening of the patient and will extend along the face of the patient exteriorly of said body opening when said tracheal tube is installed for use, said proximal or machine end portion terminating in a free end adapted for attachment to a machine with which the tracheal tube is to be used, the entire tube being of substantially uniform diameter externally and internally prior to attachment to a machine connector, and said proximal or machine end being sufficiently long in any given size of tracheal tube to position the bend portion at the location of emergence of the tube from a patient's body opening through which the tracheal tube extends and the machine connector well away from said body opening.

## 3,964,489
## SOOTHING TEAT

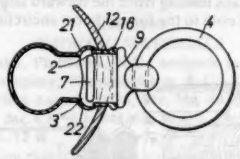
**Lutz Kesselring, Zeven, Germany, assignor to MAPA GmbH, Hannover, Germany**

**Filed Sept. 6, 1974, Ser. No. 503,866**

**Claims priority, application Germany, Sept. 27, 1973, 2348562**

**Int. Cl.² A61J 17/00**

**U.S. Cl. 128—360** **4 Claims**




1. A soothing teat comprising a teat nipple made of a resilient material such as rubber, the teat nipple including a mouthpiece portion and an integral hollow shaped neck portion having a free end spaced from the mouthpiece portion with an annular bead extending around the free end; a clamp member fitted into and mounting the neck portion of the teat nipple, said clamp member having a first end and a second end with the first end located within the neck portion, the clamp member having a cross-sectional configuration conforming to the shaped neck portion of the teat nipple, the clamp member having a pair of outwardly projecting spaced lugs at its first end, the neck portion of the teat nipple including a pair of spaced interiorly concave first vaulting ridges; a curved mouth-plate mounted on said neck porton of the teat nipple intermediate said pair of first vaulting ridges and said annular bead at the free end of said neck portion wherein the said neck portion of said teat nipple having a pair of narrow side walls and a pair of longitudinal side walls extending between said narrow side walls and said clamp member comprises a body of a substantially flat parallelepiped configuration having a pair of narrow side walls and a pair of longitudinal side walls extending between said narrow side walls, said longitudinal side walls of said neck portion and of said clamp member being wider than the narrow side walls thereof, the lugs extending at least from the narrow side walls of the clamp member body, the interior surfaces of said first vaulting ridges on the neck portion of the teat nipple mating with said lugs and defining attachment and alignment means for mounting the neck portion of the teat nipple on the clamp member and thus positioning the mouthpiece portion with respect to the clamp member and for retaining the mouth-plate or shield at a predetermined spacing from the mouthpiece portion of the teat nipple, the clamp member further includes outwardly extending ridge shaped protrusions from the longitudinal side walls of the clamp member body in the vicinity of the lugs at the first end of said clamp member, and the neck portion of the teat nipple includes a pair of spaced interiorly concave second vaulting ridges mating with the protrusions on the longitudinal side walls of the clamp member body, the second vaulting ridges located along a line interconnecting the first vaulting ridges and positioned on the wider longitudinal side walls of the neck portions.

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## 3,964,490
## LEAD STORAGE APPARATUS FOR ELECTROMEDICAL DEVICE

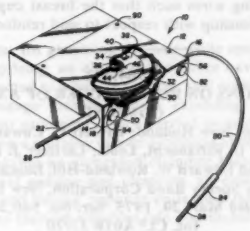
**George E. Nelms, Minneapolis, Minn., assignor to Medtronic, Inc., Minneapolis, Minn.**

**Filed Jan. 14, 1975, Ser. No. 540,807**

**Int. Cl.² A61N 1/00**

**U.S. Cl. 128—419 R** **1 Claim**

1. In an electromedical device having main housing means housing power supply means and electronic signal circuitry electrically connected to said power supply means; reel means; and elongated lead means associated with said reel means for electrically connecting said electronic signal circuitry to a remote situs; the improvement which comprises: reel housing means detachably connected to said main housing means, said reel housing means housing said reel means, said reel means comprising at least two reels mounted on a common axis, an equivalent number of said lead means each associated with a single reel, said reels being electrically insulating and independently rotatable in opposing directions to allow withdrawal of a length of its respective lead means therefrom, retracting means adapted to exert a retracting force capable of causing said length of said lead means to retract into storage relationship on its respective reel, said reel housing means having port means providing a passage for each of said lead means from said reel means to the exterior of said reel housing means, and selectively activatable locking means communicating with said port means to prevent movement of



each of said lead means through said port means, the number of port means and locking means being equivalent to the number of said reels and said lead means, and an equivalent number of aperture means in said reel housing means for slidably receiving each of said locking means, each of said locking means comprising plunger means having a channel extending through said plunger means dimensioned to allow passage therethrough of said lead means, each of said channels communicating with its respective port means, and spring means located in each of said aperture means positioned to enable operation of said plunger means, said spring means in its relaxed state maintaining said channel of said plunger means such that said locking means is in a locking position preventing movement of said lead means through said port means, and said spring means in its loaded state maintaining said channel of said plunger means such that said locking means is in a nonlocking position wherein movement of said lead means through said port means is permitted.

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## 3,964,491
## BRASSIERE CONSTRUCTION

**George Martini, Brooklyn, N.Y., assignor to Glamorise Foundations, Inc., New York, N.Y.**

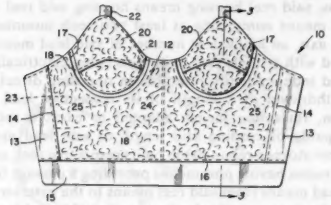
**Continuation-in-part of Ser. No. 345,967, March 29, 1973, abandoned. This application Aug. 16, 1974, Ser. No. 498,237**

**Int. Cl.² A41C 3/10**

**U.S. Cl. 128—476** **3 Claims**

1. In a brassiere, a front section, a pair of side sections, and lines of stitching connecting said side sections to opposite side edges of the front section, said front section comprising a fixed outer panel having an upper portion with a pair of transversely spaced substantially semi-circular recesses therein, an elastic inner panel underlying the upper portion of the outer panel, a pair of breast cups provided on the inner panel, lower portions of said cups projecting forwardly through the recesses in the outer panel, a pair of substantially semi-circular reinforcing wires embedded in the edges of the outer panel defining said recesses in fixed, non-pivotable relationship to said outer panel, the sides of said inner panel being connected to said outer panel by said lines of stitching, and the lower edge of said inner panel being secured to the outer panel by further

lines of stitching along lines which are spaced downwardly from said recesses so as to define substantially crescent-shaped pockets between the inner and outer panels around the



lower portion of said cups, and isolating said breast cups from said reinforcing wires such that the breast cups are in free-floating relationship with respect to said reinforcing wires.

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**3,964,492**

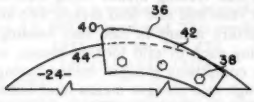
**PROJECTIONS ON ROTOR AUGER OF AXIAL FLOW COMBINE**

**John B. Crego, New Holland; Everett C. Cowan, Jr., Parkesburg; John D. Riffanacht, Leola; Larimer J. Knepper, New Holland, and Edward W. Rowland-Hill, Lancaster, all of Pa., assignors to Sperry Rand Corporation, New Holland, Pa.**

**Filed Mar. 20, 1975, Ser. No. 560,266**

**Int. Cl.² A01F *12/20***

**U.S. Cl. 130—27 T** **9 Claims**



1. A rotor for an axial flow combine having one end comprising an inlet end and rasp bars extending longitudinally thereof from said inlet end toward the other end for coaction with a complementary concave to thresh and separate grain from crop material, and an auger fixed to and extending forwardly from said inlet end of said rotor and concave and having a continuous spiral flight of predetermined length provided with a relatively smooth peripheral edge, in combination with a series of wear-resistant projections attached to said flight in circumferentially spaced relation to each other along the periphery of said flight and extending beyond the peripheral edge of said flight, the outer profile of each of said projections having at least one curved portion projecting radially farther than other portions of said profile of said projections to effect aggressive intermittent engagement with crop material when rotated in a direction for said auger to feed the same toward said rasp bars and concave for threshing thereby while minimizing wear upon the periphery of said flight.

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**3,964,493**

**CIGARETTE FILTER**

**Jack C. Baker, Atlanta, Ga., assignor to Baker-Alpha Corporation, Atlanta, Ga.**

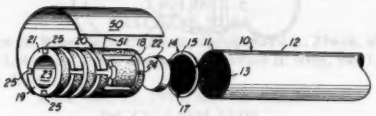
**Continuation-in-part of Ser. No. 286,851, Sept. 7, 1972, abandoned. This application Oct. 30, 1973, Ser. No. 411,047**

**Int. Cl.² A24B *15/02*; A24D *1/04***

**U.S. Cl. 131—10.5** **11 Claims**

1. In a filtered cigarette of the type wherein tobacco is contained in a sheath in the forward portion of the cigarette, the distal end of which is lighted so that the smoke will be drawn through the tobacco and the proximal end of the cigarette into the rear portion of the cigarette by the person smoking the cigarette, the combination therewith of a filter in the rear portion of said cigarette, said filter being characterized by:

a. a rigid core having a path for said smoke from the distal end of said core to the proximal end thereof and including a plurality of longitudinally spaced encircling grooves in the surface of said core encircling said core, at least one interconnecting groove means in the surface of said core interconnecting said encircling grooves, an inlet port groove means leading from the forward edge of the distal end of said core to the forwardmost encircling groove and



forming essentially the only path for a major portion of said smoke from said tobacco to said forwardmost encircling groove, one of the aforesaid groove means including a plurality of longitudinally and transversely extending passageways for separating and recombining the entire stream of smoke before the smoke enters one of the encircling grooves and discharge port means communicating with the rearmost encircling groove and through which the smoke can be withdrawn by a person; and

b. a cover overlying the surface of said core for closing the open portions of said encircling and interconnecting grooves, said inlet port and said discharge port means.

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**3,964,494**

**COMPOSITIONS FOR SMOKING**

**Jackie L. White, Pfafftown, N.C., assignor to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.**

**Filed Oct. 21, 1974, Ser. No. 516,743**

**Int. Cl.² A24B *3/14, 13/00, 15/08***

**U.S. Cl. 131—17 R** **11 Claims**

1. A smoking material which contains comminuted puffed milo in a form resembling cut cigarette filler tobacco or cut pipe tobacco.

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**3,964,495**

**SMOKING COMPOSITIONS**

**Jackie L. White, Pfafftown, N.C., assignor to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.**

**Filed Apr. 15, 1974, Ser. No. 460,782**

**Int. Cl.² A24B *3/14, 13/00, 15/08***

**U.S. Cl. 131—17 R** **11 Claims**

1. A smoking material which contains comminuted popped corn in a form resembling cut cigarette filler tobacco or cut pipe tobacco.

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**3,964,496**

**COMPOSITIONS FOR SMOKING**

**Jackie L. White, Pfafftown, N.C., assignor to R. J. Reynolds Tobacco Company, Wintston-Salem, N.C.**

**Filed Aug. 1, 1974, Ser. No. 493,535**

**Int. Cl.² A24B *3/14, 13/00, 15/08***

**U.S. Cl. 131—17 R** **11 Claims**

1. A smoking material which contains comminuted puffed rice in a form resembling cut cigarette filler tobacco or cut pipe tobacco.

3,964,497

## SMOKING COMPOSITIONS

Jackie L. White, Pfafftown, N.C., assignor to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Aug. 1, 1974, Ser. No. 493,534
Int. Cl.² A24B 3/14, 13/00, 15/08
U.S. Cl. 131—17 R 11 Claims

1. A smoking material which contains comminuted puffed wheat in a form resembling cut cigarette filler tobacco or cut pipe tobacco.

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3,964,498

## SMOKING MATERIALS

Jackie L. White, Pfafftown, N.C., assignor to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Aug. 1, 1974, Ser. No. 493,552
Int. Cl.² A24B 3/14, 13/00, 15/08
U.S. Cl. 131—17 R 11 Claims

1. A smoking material which contains comminuted puffed millet in a form resembling cut cigarette filler tobacco or cut pipe tobacco.

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3,964,499

## PROCESS FOR PERMANENTLY SHAPING HAIR

Theodor Wajaroff; Eugen Konrad, both of Darmstadt, and Dieter Hoch, Pfungstadt, all of Germany, assignors to Wella AG, Darmstadt, Germany

Filed Oct. 15, 1974, Ser. No. 515,371
Int. Cl.² A45D 7/04
U.S. Cl. 132—7 8 Claims

1. Process for permanently waving or straightening human hair comprising the steps of pretreating the hair with a detergent solution containing an alkali-metal or ammonium sulfite, wetting the hair with an alkaline solution of a mercaptocarboxylic acid salt, winding the hair up on perforated hollow curlers having a diameter of 10–24 mm, rinsing the hair with water and removing the excess water from the hair, in separate steps or in a combined step treating the hair with hydrogen peroxide for fixing the same and with a polymerizate for setting the same, drying the hair, unwinding the hair, from the curlers, and combining the hair in accordance with a desired hair fashion.

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3,964,500

## LUSTERIZING SHAMPOO CONTAINING A POLYSILOXANE AND A HAIR-BODYING AGENT

Raymond Drakoff, New York, N.Y., assignor to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 428,288, Dec. 26, 1973, abandoned.
This application June 18, 1975, Ser. No. 588,120
Int. Cl.² A61K 7/06
U.S. Cl. 132—7 16 Claims

1. A lusterizing shampoo composition comprising:

i. about 5% to about 25% of an anionic or amphoteric surfactant,

ii. about 3% to about 60% of a polydimethylsiloxane having a viscosity of about 1000 to about 2,500,000 centistokes at 25°C,

iii. about 1% to about 25% of a hair-bodying agent selected from the group consisting of:

A. A wood rosin having a softening point of about 96°C to about 125°C and a Gardner-Holt viscosity of between about 20 and 40;

B. Bleached and dewaxed shellac;

C. Sucrose acetate isobutyrate; and

D. A cationic amino cellulose compound; and

iv. about 30% to about 91% of a solvent, said solvent comprising 0% to about 50% ethanol, basis by weight of said solvent, the balance being water.

16. A process for imparting luster to hair on the human head, comprising washing said hair with the shampoo composition defined in claim 14 in a sufficient amount for depositing on the hair said polydimethylsiloxane and to impart visual luster with substantially no tactile feel of oiliness, and rinsing to thereby remove substantially all foaming components from the hair.

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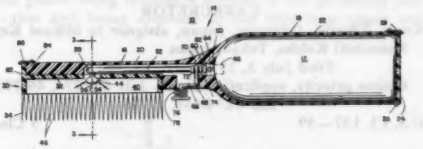
3,964,501

## HAIR GROOMING APPARATUS

Robert R. Matchett, R.R. 2, Box 275, Carmel, Ind. 46032

Filed Feb. 3, 1975, Ser. No. 546,681
Int. Cl.² A45D 24/00
U.S. Cl. 132—11 A 10 Claims



1. Apparatus for grooming the hair while spraying a liquid thereon comprising: an elongated member having a support portion connected to a handle portion, said member having an elongated passage formed therein extending between said portions, a hair grooming device carried by said support portion and having a plurality of hair grooming elements thereon, said device having an elongated chamber therein communicating with said passage and elements, an elongated tube in said passage and having opposite ends, said tube having dispensing means thereon adjacent one end thereof for dispensing liquid into said chamber for distribution to said elements, said chamber providing attachment for at least two longitudinal rows of elements; one of said rows being laterally spaced in one direction from said dispensing means and another of said rows being laterally spaced in the opposite direction of said dispensing means; whereby said elements are in interceptive distributive relation on either lateral side of said dispensing means, the other end of said tube being adapted to be connected to a source of liquid, and control means on said support portion intermediate said handle portion and device and coupled to said source for causing a flow of liquid in said tube.

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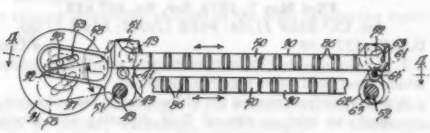
3,964,502

## COMBINED HAIR STYLER AND DETANGLER

Ikuo I. Komatsu, Winona, Minn., assignor to Sunbeam Corporation, Chicago, Ill.

Filed July 14, 1975, Ser. No. 595,459
Int. Cl.² A45D 24/00
U.S. Cl. 132—11 A 10 Claims



1. In a combination hair styling and detangling appliance of the type which is characterized by a housing having a handle, air inlet means, and an elongated air discharge outlet, by a tangential fan for directing a flow of air from said inlet means to said discharge outlet and a first motor for driving said fan, by a pair of combs mounted longitudinally of said discharge outlet and in the path of air flow therefrom for reciprocating movement in an out-of-phase relationship to provide a hair detangling function, and by a second motor for reciprocating said combs, the improvement which comprises first comb support and drive means pivotally mounted in said housing at one end of said air discharge outlet for releasably supporting one end of each of said combs, said first comb support and

drive means being drivingly connected to said second motor in a manner such that said support and drive means is rockable about a vertical axis to impart out-of-phase reciprocating movement to said combs, second comb support means pivotally mounted in said housing at the other end of said air discharge outlet for releasably supporting the other ends of said combs, and a manually operable comb ejector slidably mounted on said housing adjacent said air discharge outlet for ejecting said combs from said first and second comb support means.

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**3,964,503**

**CARBURETOR**

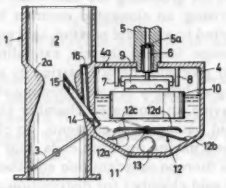
**Kunio Kikuchi, Odawara, Japan, assignor to Mikuni Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed July 2, 1975, Ser. No. 592,654**

**Claims priority, application Japan, July 6, 1974, 49-79263**

**Int. Cl.² F16K *17/36***

**U.S. Cl. 137—39** **9 Claims**



1. A carburetor comprising a float chamber formed to be U-shaped as seen in the longitudinal direction of the car on the bottom surface, a float floatably contained in said float chamber, a needle valve capable of opening and closing a fuel inflow port to said float chamber in association with the movement of said float, a rocking member rockably arranged in said float chamber and capable of contacting the lower surface of said float, and a ball capable of rolling on the bottom surface of said float chamber to rotate said rocking member, said float being pushed up by said rocking member rotated by said ball and said fuel inflow port being thereby forcibly closed with said needle valve when said float chamber inclines by an angle larger than a predetermined angle from its normal position.

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**3,964,504**

**LEVELING VALVE**

**Harold G. Inhofer, Hopkins, Minn., assignor to Integrated Power, Incorporated, St. Louis Park, Minn.**

**Filed May 7, 1974, Ser. No. 467,655**

**Int. Cl.² B66F *11/04*; F15B *13/042*; F16K *11/00***

**U.S. Cl. 137—39** **4 Claims**

1. A valve member for maintaining an article at a predetermined level, said valve member including:

a. a body to be mounted for tilting movement and having at least, an inlet, a pair of fluid directing and receiving passages and an outlet;

b. a first valving passage between said inlet and said pair of fluid directing passages;

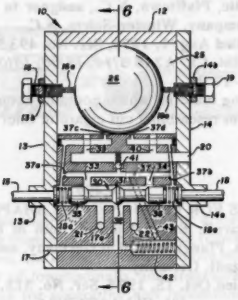
c. a first spool valve within said first valving passage and permitting communication between said inlet and said fluid directing passages when in a first position and when in a second position permitting communication between said inlet and one of said fluid directing passages while also permitting communication between the other of said fluid directing passages and said outlet;

d. a longitudinally extending, generally cylindrical control passage formed in said body;

e. a generally spherical tilt responsive control member having a diameter less than the diameter of said cylindrical control passage and arranged for rolling movement within said control passage on a surface thereof;

f. resilient means engaging said control member for positioning said control member generally longitudinally centrally of said passage when the valve body is in a level position and permitting said control member to roll within said passage when the body is tilted;

g. a first pair of inlet passages spaced longitudinally within said control passage and opening on said surface and being positioned respectively on either side of said control member when the same is centrally positioned and communicating with said inlet;



h. a first pair of outlet passages spaced longitudinally within said control passage and opening on said surface and being positioned resectively exteriorally of said said pair of inlet passages and communicating with said outlet; and,

i. a pair of interconnecting passages communicating respectively with said pair of inlet passages and the ends of said spool valve whereby movement of said control member on said surface to close either of said inlet passages will provide a pressure increase to the respective end of the spool valve to shift the same and direct inlet fluid to one of said fluid directing and receiving passages.

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**3,964,505**

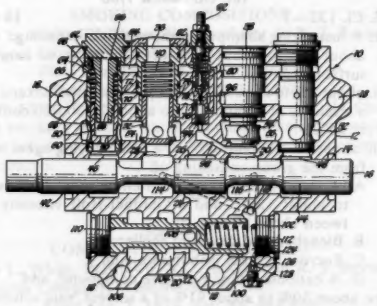
**POWER TRANSMISSION**

**Dennis J. McAvoy, Lake Orion, Mich., assignor to Sperry Rand Corporation, Troy, Mich.**

**Filed Feb. 10, 1975, Ser. No. 548,651**

**Int. Cl.² F15B *13/04***

**U.S. Cl. 137—106** **3 Claims**



1. A directional valve assembly for hydraulic power systems comprising a body having a sliding spool of the closed center type arranged to selectively direct inlet fluid to either of two motor ports, load holding check valves between the spool and

each motor port, combined counter balance and relief check valves, one connected between each motor port and a return port and each having a control piston exposed through a restriction to its respective motor port pressure, pilot valves for relieving the pressures on the respective control pistons at a predetermined pressure level, and a secondary operating means for the pilot valves each connected directly to the sliding spool valve at a point upstream from the load holding check valve for the opposite motor port, whereby each pilot valve controls one check valve to open it, either for limiting maximum pressure in its own motor port or in response to operating pressure at an opposite motor port.

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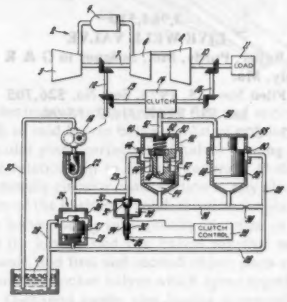
**3,964,506**

## PRESSURE CONTROL SYSTEM

**Richard G. Grundman, Coopersville, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed May 2, 1973, Ser. No. 356,292**
**Int. Cl.[2] H01M 4/36; F16D 25/00**
**U.S. Cl. 137—85** **2 Claims**




1. A system for supplying an actuating fluid to an operated device and maintaining the supplied fluid at a variably controllable pressure comprising, in combination, a source of fluid under pressure; externally controllable pilot valve means supplied from the source and effective to provide pilot fluid at a pressure varying substantially solely as a function of the external control input to the pilot valve means; an outlet line for delivering the fluid to the operated device; constantly open variable area throttling valve means connecting the source to the outlet line for flow from the source to the outlet line; by-pass valve means connecting the outlet line to a drain line; actuating means for each valve means responsive to pilot fluid pressure and outlet line pressure acting in opposition on the valve means, the throttling valve means being biased toward closing by outlet line pressure and the by-pass valve means being biased to open by outlet line pressure.

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**3,964,507**

## SLIDE VALVE WITH INTEGRATED REMOVABLE INTERNALS

**Frank J. Jandrasi, and Howard A. Purvis, both of Houston, Tex., assignors to Tapco International, Inc., Houston, Tex.**

**Filed Jan. 13, 1975, Ser. No. 540,674**
**Int. Cl.[2] F16K 3/30**
**U.S. Cl. 137—375** **15 Claims**

1. A slide valve with removable integrated internals comprising,

a body provided with a flow passage therethrough including an enlarged internal portion,

a body portion connected at one end to the body and having a projecting portion extending into the enlarged internal portion, the projecting portion having its sides spaced from internal walls of the enlarged internal portion thereby forming a transverse space on each side of the projecting portion out of direct flow through the flow passage,

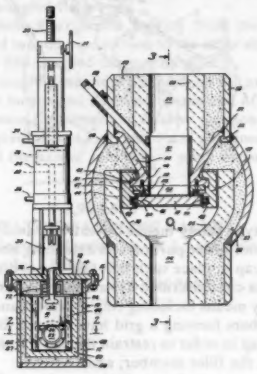
a valve seat having a valve surface releasably secured on the projecting portion,

a slide valve slidable in the enlarged internal portion adjacent the valve surface and having side members extending transversely into the transverse space, and

interfitting guides and slides operable for guiding the slide valve into open and closed positions adjacent the valve surface,

the slides being disposed on the side members of the slide valve,

the guides being releasably secured to the projecting portion and being disposed in the transverse space and



spaced from the internal walls of the enlarged internal portion and out of the direct flow through the flow passage,

whereby the valve seat and guides are integrated by both being releasably secured to the projecting portion and are out of direct contact with the body thereby permitting external setable clearances between the valve seat and the slide valve which remain fixed under temperature or pressure excursions,

the body provided with an opening of a size permitting insertion in and withdrawal from the body of the valve seat, the slide valve and its slides, and the guides therethrough, and

a closure removably secured to the body closing the opening.

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**3,964,508**

## SAFETY CAP ASSEMBLY FOR PRESSURIZED VESSELS

**Galen R. Miller, Tallmadge, Ohio, assignor to Chemidyne Corporation, Macedonia, Ohio**

**Filed July 17, 1974, Ser. No. 489,266**
**Int. Cl.[2] B65D 51/16; F16P 1/00**
**U.S. Cl. 137—377** **1 Claim**

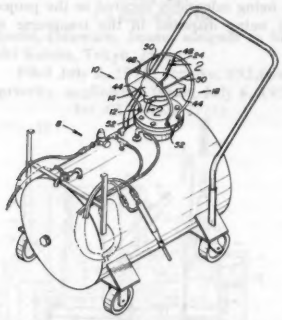
1. A safety cap assembly comprising:

a filler member having a lower portion for attachment to a pressurizable vessel and an upper portion, a complementary closure cap received on said filler member upper portion, said cap having an elongated skirt portion and a transverse planar portion, thread means on said filler member and said closure cap skirt for non-releasably interacting such that said cap cannot be normally unscrewed from said filler member when said vessel is pressurized;

gasket means mounted between said filler member upor. portion and said cap planar portion for establishing sealing engagement between said filler member and said cap;

means for achieving the release of vessel pressure when said cap is unscrewd including a plurality of bleed holes spaced within said cap adjacent said cap planar portion and extending through said skirt of said cap;

at least one circumferentially located venting channel positioned at the externally threaded upper portion of said filler member which has a greater depth than the root depth of the threads of said filler member;



a cage-type safety means operatively attached to said filler member lower portion and extending about said cap with said cap in place such that said cap is disposed within the region circumscribed by said safety means, said cage-type safety means including ring members and connecting bar members forming a grid having open areas smaller than the cap in order to restrain the cap if it should be expelled from the filler member; and

a chain operatively attached to and extending between said closure cap and safety means.

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**3,964,509**

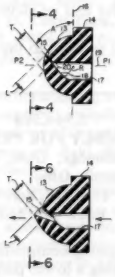
**CHECK VALVE**

**Charles B. Daubenberger, and Charles J. Daubenberger, both of Van Nuys, Calif., assignors to Da/Pro Rubber, Inc., Van Nuys, Calif.**

**Filed Feb. 14, 1975, Ser. No. 549,988**

**Int. Cl.² F16K *15/14***

**U.S. Cl. 137—525.1** **3 Claims**



**1.** A check valve, comprising:

a single integral body of an elastomeric material having an externally shaped portion substantially that of a hemisphere of given radius R, and an inlet passage passing into the base of the hemisphere and terminating in a normally closed inner end to define a wall thickness to the exterior of said hemisphere of a given value T, said inner end being cut through to the outer forward periphery of the hemisphere to define a slit at a given acute angle A to a plane normal to the axis of the inlet passage, said slit having a given transverse dimension D and a given length L measured from the interior to the outer periphery of said hemisphere, the inner end of said inlet passage terminating in a V-shape, the vertex of the V defining an angle equal to said given acute angle, said Slit initiating at the vertex of said V, and wherein:

$$.125R<T<.75R$$
$$20°<A<50°$$
$$.25R<D<1.25R, \text{ and}$$
$$.0625R<L<.375R$$

whereby when fluid pressure across the hemisphere between said inlet passage and the exterior exceeds a given differential value, said slit will be opened to pass fluid from the interior to the exterior, said slit closing when the differential pressure reverses to block any reverse flow of fluid through said body.

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**3,964,510**

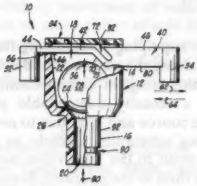
**LIVE WELL VALVE**

**William G. Roller, Purdy, Mo., assignor to G & R Industries, Inc., Purdy, Mo.**

**Filed Nov. 25, 1974, Ser. No. 526,705**

**Int. Cl.² F16K *31/52, 15/04***

**U.S. Cl. 137—528** **5 Claims**



**5.** In a valve comprised of a valve body having ball member compartment, a valve seat, a ball member and a connecting conduit, the improvement comprising:

an actuator bar positionable in a first position wherein the ball member has moving clearance and positionable in a second position wherein the ball member is forced thereby in sealing engagement with the valve seat, the actuator bar slidingly supported in opposingly aligned grooves in the valve body, the actuator bar characterized as having:

a clearance end;

a wedge end having a ball member engage side and a notch in the opposite side;

tab means protruding from the actuator bar clearance end and cooperating with the one of the grooves for retaining the actuator bar in the first actuator bar position; and,

the actuator bar has a retaining seat formed in the ball member engage side generally opposite the notch in the opposite side.

## 3,964,511
## PARTIALLY ROTATED FASTENER COMPRISING CIRCULAR FASTENER HALVES CAPTURED IN COMPLEMENTARY CAVITY

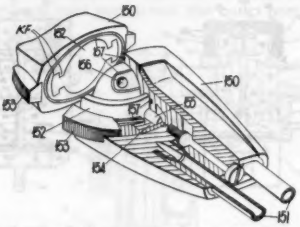
David Christopher Cattermole, Enfield, England, assignor to Elliott Brothers (London) Limited, Chelmsford, England

Division of Ser. No. 293,342, Sept. 29, 1972. This application Nov. 11, 1974, Ser. No. 522,774

Claims priority, application United Kingdom, Nov. 30, 1971, 55510/71

Int. Cl.² F16L *29/00*

U.S. Cl. 137—614.06 13 Claims



11. A fastening system comprising first and second fastener halves, each of said halves being a solid of revolution formed about a circular plane surface, said halves coming together in face-to-face relationship to form a generally O-shaped solid having a generally circular cross section in any plane between the two sides of the O-shaped solid, the circular plane surfaces of said two halves being substantially identical in shape and size, means for keying said two halves together so that they rotate as a unit, and first and second object parts respectively containing mating socket halves which come together to form a generally O-shaped cavity also having a generally circular cross section in any plane between the two sides of the O-shaped cavity, said sockets having internal contours which are substantially complementary to the external contours of the corresponding fastener half, and complementary passageways formed in at least one fastener half and at least one of the object parts.

## 3,964,512
## SELF-SUPPORTING PIPE BOOM

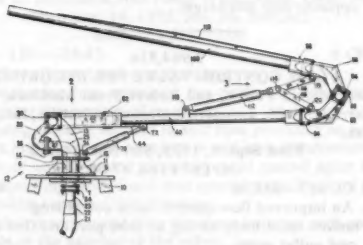
Odilon Dumas, 964 Papineau St., Laval, Quebec, Canada

Filed Aug. 26, 1974, Ser. No. 500,686

Claims priority, application United Kingdom, Sept. 10, 1973, 42512/73

Int. Cl.² F16L *3/00*

U.S. Cl. 137—615 10 Claims



1. In a self-supporting pipe boom, gooseneck yoke means for pivotally interconnecting the adjacent ends of two pipe sections, comprising:

a first pair of side plates fixedly secured to the outboard end of a first pipe section on opposite sides thereof, the plates of said first pair projecting away from the intermediate region of said first pipe section and being parallel to one another,

a second pair of side plates fixedly secured to the inboard end of a second pipe section on opposite sides thereof, the side plates of said second pair projecting away from the intermediate region of said second pipe section and being parallel to one another, a circular aperture in each one of said plates of said first and second pairs in the free ends thereof, said apertures being aligned on an axis normal to the longitudinal axis of each pipe section,

hollow pivot means extending through said apertures in said plates for interconnecting said first and second pipe sections

a first gooseneck extension leading from the outboard region of said first pipe section to one side of said pivot means and coupled therewith,

a second gooseneck extension leading from the inboard region of said second pipe section to the other side of said pivot means and coupled therewith,

and rotatable coupling means centered upon the axis of said hollow pivot means and disposed at one end of said hollow pivot means for permitting relative rotation between said hollow pivot means and one of said gooseneck extensions around the axis of said hollow pivot means.

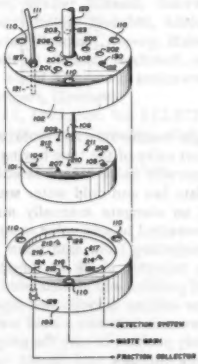
## 3,964,513
## ROTATING SAMPLING VALVE

Stanley Frank Molner, Morristown, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Apr. 8, 1975, Ser. No. 566,634

Int. Cl.² G01N *1/20*

U.S. Cl. 137—624.18 5 Claims




1. In a rotating sample valve comprising:

a. a cylindrical plate containing a plurality of channels parallel to its longitudinal axis, said channels being symmetrically disposed about the center axis of said cylindrical plates;

b. an upper and lower fixed plate between which said cylindrical plate is rotatably mounted, said upper plate and lower plate each containing the same plurality of channels symmetrically disposed around their respective center axis so that such channels are in operative flow relation with corresponding channels in said cylindrical plate;

c. a stepping motor means which is operatively connected to said cylindrical plate;

the improvement which comprises providing said channels in said cylindrical plate in a number of concentric sets the channels of any set being disposed at a different azimuth from the channels of the other sets wherein the volume of the channels in each set is equal while the volume of the channels in different sets may vary, providing corresponding channel sets in said upper and lower fixed plates, providing detachably attached inlet and outlet means to one of the sets of channels in each of the said upper and lower plates respectively which correspond with a channel set in said cylindrical plate thus allowing the selection of a variable sample volume from the volumes of the channels in each of said channel sets in said cylindrical plate and providing said stepping motor means with a step proportional to the number of channel sets.

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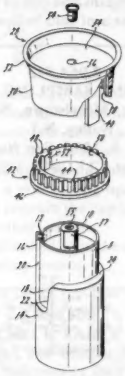
3,964,514

## PUSH-PULL SINGLE HANDLE WATER FAUCET VALVE

**Alex Manoogian, Groose Pointe Farms, and Eric V. Pullen, Southfield, both of Mich., assignors to Masco Corporation of Indiana, Greensburgh, Ind.**

**Filed July 1, 1974, Ser. No. 484,989**
**Int. Cl.² F16K *11/00***
**U.S. Cl. 137—625.17** **6 Claims**



1. A single handle hot and cold water mixing and flow control faucet valve of the type having a main body enclosing relatively movable valve means selectively operable to connect or isolate hot and cold water sources with water outlet means and an elongate manually movable operating stem operably connected to said valve means for movement therewith and projecting from said main body, said stem being reciprocally movable along its longitudinal axis between a retracted off position and an extended full volume position to vary the flow volume through said faucet valve and rotatable about its own axis between a cold water only position and a hot water only position to vary the proportions of hot and cold water passing through said faucet valve. the improvement comprising: first and second fixed stop means spaced apart on the outer periphery of said main body and extending substantially parallel to said axis, third fixed stop means adjacent said second fixed stop means on the outer periphery of said main body and extending at an angle from said second stop means, and first movable stop means secured to said stem for movement therewith, said third fixed stop means and said first movable stop means cooperating to prevent axial movement of said stem to the retracted off position unless said stem is in the cold water only rotational position, said first movable stop means in said retracted off position being received between said first and second fixed stop means and cooperating therewith to prevent rotation of said stem from the cold water only position while permitting axial movement of said stem towards the extended full volume position, said first movable stop and said first fixed stop means cooperating to prevent rotation of said stem in a first rotational direction from said cold water only position when said stem is in all axial positions.

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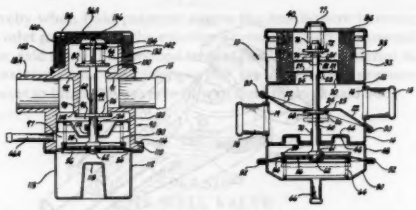
3,964,515

## BY-PASS VALVE WITH PRESSURE RELIEF FEATURE

**Edward T. May, St. Louis County, Mo., assignor to ACF Industries, Incorporated, New York, N.Y.**

**Filed Dec. 23, 1974, Ser. No. 535,644**
**Int. Cl.² F16K *11/02, 31/145***
**U.S. Cl. 137—625.27** **3 Claims**



1. An air by-pass and pressure relief valve having a valve body, an inlet port, an outlet port and a by-pass port in said valve body, a wall dividing said valve body, said wall having an opening therethrough to define a main valve seat, a diaphragm housing secured to a first end of said valve body, a diaphragm secured to said valve body by said diaphragm housing, said diaphragm defining a vacuum chamber and a second chamber, a vacuum inlet fitting into said vacuum chamber, a valve stem secured to said diaphragm by a pair of backing plates, one on each side of said diaphragm, a biasing spring abutting one of said backing plates to bias said diaphragm in a first direction opposing the bias of vacuum applied to said vacuum inlet fitting, biasing spring confining means constituting a vacuum chamber closure, said air by-pass and pressure relief valve further comprising

A. an outlet valve head slideably mounted on said valve stem and positioned by a first shoulder on said stem, said outlet valve head operable to open and close said main valve seat,

B. a by-pass valve head slideably mounted on said valve stem and positioned by a second shoulder on said stem, said by-pass valve head operable to open and close a by-pass valve seat port defined by a by-pass valve seat in a partition separating said valve body from at least one by-pass discharge opening, and

C. a by-pass valve biasing spring abutting said by-pass valve head to bias said by-pass valve head toward the said by-pass valve seat during normal operation but moveable away from said by-pass valve seat on over pressure conditions, said by-pass valve biasing spring also abutting a spring retaining member fastened to an end of said stem opposite said diaphragm.

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3,964,516

## FLOW CONTROL VALVE FOR DECOKING

**Robert Merrill Purton, and Robert Brent Maddock, both of Cerritos, Calif., assignors to Dresser Industries, Inc., Dallas, Tex.**

**Filed Sept. 9, 1975, Ser. No. 611,762**
**Int. Cl.² F16K *47/08***
**U.S. Cl. 137—625.38** **4 Claims**

1. An improved flow control valve comprising:

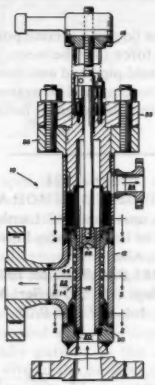
a hollow valve body having an inlet port and first and second outlet ports;

sleeve means mounted in said body having an open end located adjacent said inlet port, a closed end located adjacent said second outlet port, a plurality of first aper-

tures near said open end extending through said sleeve means and arranged to be, at times, in communication with said inlet port, a plurality of second apertures extending through said sleeve means and arranged to be, at times, in communication with said second outlet port, and a plurality of perforations extending therethrough adjacent said first outlet and between said first and second apertures;

an annular valve seat in said body encircling said inlet port;

an elongated valve member movably located in said sleeve, said valve member having a longitudinally extending passageway therethrough providing communication between the open and closed ends of said sleeve and being of sufficient length to close said perforations, said valve member being engageable with said valve seat to prevent flow from said inlet port to said first outlet port;



valve operating means operably connected with said valve member for moving said valve member to a first position in engagement with said seat wherein said first apertures and perforations are closed to flow and said second apertures are open permitting restricted flow from said inlet port to said second outlet port, to a second position wherein said first and second apertures are open permitting restricted flow from said inlet port to both said outlet ports while preventing flow through said perforations, and to a third position wherein said perforations are open and said second apertures are closed permitting substantially unrestricted flow from said inlet port through said perforations into said first outlet port while preventing flow through said second apertures into said second outlet port.

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**3,964,517**

**FOUR WAY DIVERTER VALVE**

**Harvard G. Dickenson, 649 North Waco, Tulsa, Okla. 74127**

**Filed Jan. 14, 1975, Ser. No. 540,843**

**Int. Cl.² F16K *11/06***

**U.S. Cl. 137—625.43** **8 Claims**

1. A flow diverter valve comprising:

a base having four openings, the centers of the openings forming the corners of a square;

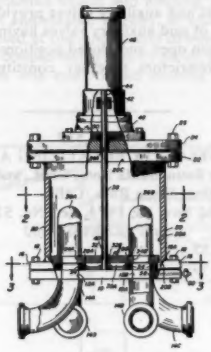
a housing sealably secured to said base providing an enclosure into which said openings in said base communicate;

a pair of uninterrupted circumferential spaced apart seals surrounding each of said base openings, each pair of seals providing a space therebetween;

a conduit means connecting the space between each pair of seals to the exterior of the valve;

a support plate supported within said housing parallel with and adjacent said base, said support plate having four openings therethrough on centers equivalent with said base openings, said support plate being rotatable relative to said base whereby said opening in said support plate may be sealably registered with said base openings;

a pair of U-tube members positioned in said housing in spaced paralleled relationship, each U-tube member having open ends registering with adjacent pairs of open-



ings in said support plate whereby each said opening in said base communicates with the interior of a said U-tube member; and

means of rotating said support plate whereby said opening therein may be registered with different of said base openings.

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**3,964,518**

**ELECTROHYDRAULIC CONTROL UNIT**

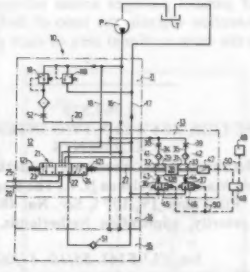
**Horst Hesse, Stuttgart; Walter Kobald, Schwieberdingen; Heinz Gand, Stuttgart; Rainer Hoheisel, Aldingen; Klaus Sopha, Stuttgart; Heinz Flaschar, Asperg; Heinz Kleinschmidt, Stuttgart; Winfried Arnold, Hochdorf, and Werner Zeuch, Waiblingen, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany**

**Filed Sept. 11, 1975, Ser. No. 612,577**

**Claims priority, application Germany, Oct. 2, 1974, 2446963**

**Int. Cl.² F15B *11/12, 13/043***

**U.S. Cl. 137—625.64** **10 Claims**



1. In a control unit for selecting one of several positions for a controlled component, particularly in an electrohydraulic control unit for selecting any one of several positions for the spool in a multi-way directional control valve, a combination comprising a source of pressurized fluid; a reservoir; a cylinder; a piston reciprocable in and dividing the interior of said cylinder into first and second chambers, said piston including

first and second end faces having identical areas and being respectively adjacent to said first and second chambers; first conduits connecting said chambers with said source; second conduits connecting said chambers with said reservoir; first flow restrictors in said first conduits; check valves provided in said first conduits to prevent the fluid from flowing out of the respective chambers via said first conduits; and means for regulating the outflow of fluid from said chambers via said second conduits, including second flow restrictors in said second conduits and auxiliary valves provided in said second conduits, each of said auxiliary valves having a valve member movable between open and closed positions and said first and second flow restrictors together constituting a hydraulic bridge circuit.

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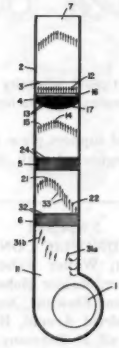
## 3,964,519
## FLUID VELOCITY EQUALIZING APPARATUS

**Kenneth W. De Baun, Santa Rosa, Calif., assignor to Air Monitor Corporation, Santa Rosa, Calif.**

**Filed Nov. 18, 1974, Ser. No. 524,740**
**Int. Cl.² F15D 1/02**
**U.S. Cl. 138—37** **8 Claims**



**1.** Apparatus for equalizing the velocity of flowing fluid including duct means defining a flowing stream of fluid; at least one open-ended honeycomb equalizing section substantially coaxial with said duct means, intercepting and conducting the fluid therethrough, said honeycomb section having a plurality of parallel passages across substantially the entire duct cross-section wherein the ratio of surface area of each passage to the cross-sectional area of each passage is at least **30.**

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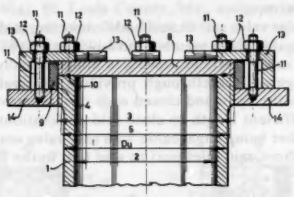
## 3,964,520
## CONNECTION BETWEEN TWO INTER ENGAGING ELEMENTS

**Hendrik Bernhard Baas, Vreeland, Netherlands, assignor to Verenigde Machinefabrieken N.V., The Hague, Netherlands**

**Filed June 19, 1974, Ser. No. 480,878**
**Claims priority, application Netherlands, June 20, 1973, 7308591**
**Int. Cl.² F16L 55/10, 41/00**
**U.S. Cl. 138—89** **10 Claims**

**1.** A fluid-tight connection between two interengaged elements comprising an elongated pipe element having an end, and a plate element with a hole receiving the end of the pipe element, said pipe element having a constant internal diameter, said end of the pipe element having a greater wall thickness and a greater outer diametral extent as compared to the remainder of the pipe element and having a non-circular shape in a plane perpendicular to the axis of the pipe element, said hole in the plate element being complementary in shape to the non-circular shape of the pipe end and receiving a first portion of said pipe end for transmitting torsional force therebetween, a lid on said pipe end to close the same, said lid having an outer surface of the same shape as the pipe end, a



ring engaging both the lid and a second portion of the pipe end to transmit torsional force therebetween, and an annular seal between said lid and said pipe end and means holding said ring on said pipe end and holding said lid against said pipe end with said seal interposed therebetween to form a liquid-tight connector.

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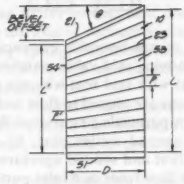
## 3,964,521
## BEVEL PIPE WINDING METHOD AND PRODUCT

**Paul W. Kao, Covina, and Homer C. Lamborn, Glendora, both of Calif., assignors to United States Pipe and Foundry Company, Birmingham, Ala.**

**Division of Ser. No. 181,824, Sept. 20, 1971, abandoned. This application Sept. 16, 1974, Ser. No. 506,438**
**Int. Cl.² 138 9/08**
**U.S. Cl. 138—176** **4 Claims**



**1.** A prestressed concrete article comprising a substantially cylindrical body of concrete having a beveled end forming a pipe body having a short side and a long side substantially 180° displaced from said short side, and a wrapping of wire under tension around said body substantially from one end to the other of the body, said wrapping having a uniform spacing all along said short side of said body and a different but uniform spacing all along said long side of said body.

**4.** A method of applying wire under tension to the periphery of a concrete body in the manufacture of concrete pipe or the like wherein the concrete body has a beveled end with a bevel offset thereby forming a pipe body having a short side and a long side substantially 180° displaced from the short side, comprising the steps of

determining a bevel ratio for a pipe body, said bevel ratio being directly proportional to said bevel offset divided by the length of the long side of said pipe body,

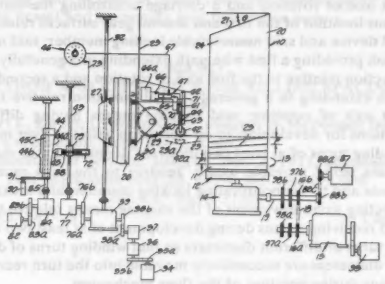
securing wire near a first end of said pipe body, and

wrapping said pipe body with said wire under tension while causing periodic deviation of said wire upon wrapping as a function of said bevel ratio to provide a modified helical wrapping on said body having a uniform spacing on the short side of the said body and a different but uniform spacing on the long side of said body, said wire being periodically and successively deviated as it is applied to said body substantially from one end to the other of said body.

## 3,964,522
## BEVEL PIPE WINDER

**Paul W. Kao, Covina, and Homer C. Lamborn, Glendora, both of Calif., assignors to United States Pipe and Foundry Company, Birmingham, Ala.**

**Filed Sept. 20, 1971, Ser. No. 181,824**
**Int. Cl.² B65H** *1/00; 242 7.21;7.22;7.23;7.16*
**U.S. Cl. 242—7.22** **3 Claims**



1. Apparatus for applying wire under tension to the periphery of a concrete body having a beveled end in the manufacture of concrete pipe or the like comprising

rotatable means for supporting and rotating a concrete pipe body substantially about the axis of said body,

carriage means for supplying wire under tension to the periphery of said pipe body to form a generally helical wrapping thereon, said carriage means including leadscrew means coupled with a carriage for driving the carriage substantially parallel to the axis of said body in supplying said wire to the periphery of said body,

displacement means on said carriage means for causing a controlled periodic deviation of said wire as it is applied to said pipe body from one end to the other thereof to provide a helical wrapping having a uniform spacing along the entire length of a first side of said body and a different but uniform spacing along the entire length of a second side of said body substantially one hundred and eighty degrees from the first side,

cam means for supplying signals to affect the operation of said displacement means, said cam means including cam and cam follower means synchronized in operation with the rotation of said pipe body and movement of said carriage means, said cam and cam follower means including a cam rotated in synchronism with the rotation of said pipe body, and including a cam follower engaging the periphery of said cam and moved with respect to the cam by second leadscrew means operated in synchronism with said leadscrew means, said cam follower including a transducer for supplying said signals to affect the operation of said displacement means, and

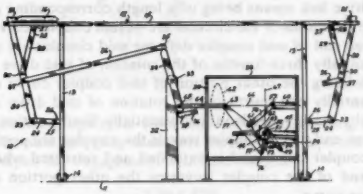
control means responsive to the signals from said cam means for controlling the operation of said displacement means in causing said controlled deviation of said wire, said control means including selector means for selecting portions of said signals and for applying control signals to said displacement means for controlling the magnitude of said deviation of wire as it is applied to said pipe body.

## 3,964,523
## SHUTTLE DRIVE LINKAGE FOR LOOMS

**Charles E. Benedict, Tallahassee, Fla., assignor to Wayne H. Coloney Co., Inc., Tallahassee, Fla.**

**Filed Dec. 12, 1974, Ser. No. 532,119**
**Int. Cl.² D03D** *49/24*
**U.S. Cl. 139—142** **11 Claims**

1. In a weaving loom having a frame, a lay mounted on a pair of swords which are swingably mounted on said frame, a pick head movably mounted on at least one end of said lay, and a weft thread carrying member adapted to be thrown from one end of said lay to the other by said pick head, the improvement comprising a housing, a drive crank rotatably supported within said housing, means for continuously driving said crank at a substantially constant speed, a drag link rotatably connected at one end to said drive crank and rotatably connected at the other end to a follower, said follower being fixed to a shaft rotatably mounted within said housing, a driven crank fixed to said shaft and rotated thereby, an elongated coupler swingably connected at one end to said driven crank and the other end of said coupler being free to move, a rocker swingably connected at one end to said housing and swingably

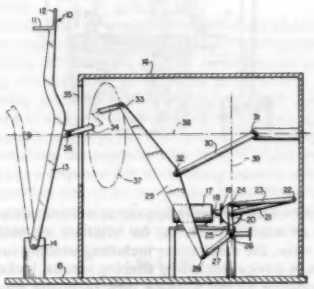


connected at the other end to an intermediate portion of said coupler so that the free end of said coupler moves in an elliptical coupler curve when said driven shaft is rotated, drive link means swingably connected at one end to the free end of said coupler, said drive link means having a length corresponding generally to the radius of one side of said coupler curve, and means drivingly connecting the other end of said drive link means to the pick head, whereby rotation of said drive crank causes the free end of said coupler to follow a first half of the coupler curve during most of the rotation and causes the free end of said coupler to follow a second half of the coupler curve during the remaining portion of the rotation of said drive crank to extend and retract said drive link means and the pick head.

## 3,964,524
## LOOM LAY DRIVE LINKAGE

**Charles E. Benedict, Tallahassee, Fla., assignor to Wayne H. Coloney Co., Inc., Tallahassee, Fla.**

**Filed Jan. 8, 1975, Ser. No. 539,546**
**Int. Cl.² D03D** *49/60*
**U.S. Cl. 139—190** **4 Claims**



1. Apparatus for intermittently advancing and retracting the lay of a weaving loom and providing an extended dwell period after the lay has been retracted, the apparatus comprising a first four-bar linkage mounted on said loom, said first linkage including a drive crank rotatably mounted on said loom,

means for rotating said crank at a substantially constant speed, a drag link pivotally connected to said drive crank, a follower swingably connected to said drag link in spaced relationship to said crank pivot, a shaft rotatably supported by said loom, said follower being attached to said shaft in a manner such that rotation of said crank causes rotation of said shaft, a second four-bar linkage including a driven crank fixed to said shaft, a rocker swingably mounted on said loom in spaced relationship to said shaft, an elongated coupler pivotally connected at one end to said driven crank and pivotally connected intermediate its ends to said rocker, the opposite end of said coupler defining an elliptical symmetric coupler curve which has a circular arc on at least one side thereof, drive link means swingably connected at one end to the free end of said coupler and swingably connected at the other end to the lay, said drive link means being of a length corresponding generally to the radius of the circular arc of said coupler curve, and the free end of said coupler defining said circular arc during substantially three-fourths of the rotation of said drive crank and defining the other portion of said coupler curve during substantially one-fourth of the rotation of said drive crank, whereby the lay dwells in a substantially fixed position when the free end of the coupler travels the circular arc portion of said coupler curve and is extended and retracted when the free end of the coupler traverses the other portion of the coupler curve.

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**3,964,525**

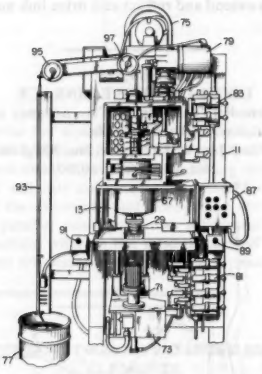
## MECHANISM FOR USE IN WINDING APPARATUS

**Richard B. Arnold, and Dallas F. Smith, both of Fort Wayne, Ind., assignors to General Electric Company, Fort Wayne, Ind.**

**Continuation-in-part of Ser. No. 359,502, May 11, 1973, abandoned, which is a division of Ser. No. 130,399, April 1, 1971, Pat. No. 3,732,897. This application May 7, 1975, Ser. No. 575,225**

**Int. Cl.² B21F *3/04***

**U.S. Cl. 140—92.1** **19 Claims**




1. A mechanism for use in apparatus utilized while developing turns of winding material for ultimate assembly with a magnetic core, the mechanism including winding turn receiving means, a device, including shaping means, locked against rotation relative to the winding turn receiving means for at least assisting in the formation of winding turns; a flyer mechanism rotatable about the shaping means about a first axis of rotation for developing winding turns about the first axis of rotation; at least one winding material guide means for at least assisting in directing winding material in a direction generally radially relative to the first axis of rotation; at least one nonrotating locking member; at least one movable locking mechanism interconnecting said nonrotating locking member and said device so that said device is locked against rotation about the first axis of rotation during movement of the flyer mechanism and for establishing an unobstructed generally radially directed shutter passage, continuously movable along a predetermined path in synchronism with the flyer means, through which winding material may be fed generally radially relative to the first axis of rotation; said locking mechanism including first and second gear surfaces spaced axially apart along the first axis of rotation and a carriage controlling the instantaneous location of the first and second gear surfaces relative to said device and said nonrotatable locking member; said mechanism providing a first wire path extending in a generally axial direction relative to the first axis of rotation and a second wire path extending in a generally radial direction relative to the first axis of rotation; said shaping means having different portions for developing, in co-operation with the flyer means, winding turns of at least two different diameters, said shaping means being movable axially relative to the turn receiving means and to the nonrotating locking member; and means for effecting axial movement of the shaping means relative to the turn receiving means during development of at least two winding turns of different diameters so that winding turns of different diameters are successively movable into the turn receiving means during rotation of the flyer mechanism.

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**3,964,526**

## METHOD AND APPARATUS FOR CLEANING ROTARY FILLING MACHINES

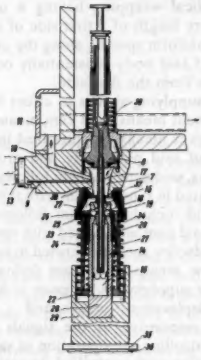
**Siegmar Sindermann, Pelkum, Germany, assignor to Holstein & Kappert Maschinenfabrik Phonix GmbH, Dortmund, Germany**

**Filed Feb. 19, 1974, Ser. No. 443,883**

**Claims priority, application Germany, Feb. 20, 1973, 2308190**

**Int. Cl.² B65B *3/04*; B67D *1/08***

**U.S. Cl. 141—1 R** **7 Claims**



1. A method of cleaning and sterilizing a rotary backpressure filling machine by introducing, securing and detaching a rinsing vessel to effect rinsing, said filling machine including at least one filling element, a tank in communication with said filling element and containing a cleaning fluid, fluid valve means in said filling element to control flow from said tank, and pressure actuated conveyor means associated therewith and adapted to support said rinsing vessel, said method comprising the steps of during rotation of said filling machine introducing said rinsing vessel to said conveyor means, centering and raising said rinsing vessel upon said pressure actuated conveyor means toward said filling element and fastening said rinsing vessel to said filling element, increasing pressure in

said rinsing vessel to achieve equalization of pressure within said rinsing vessel and within the tank of said filling machine, causing the fluid valve means of said filling machine to open as a result of said pressure equalization thereby commencing the flow of cleaning fluid from said tank into said rinsing vessel, lowering said pressure actuated conveyor means and thereby closing said fluid valve means while maintaining said rinsing vessel fastened to said filling element, and recommencing said rinsing by continued rotation of said filling machines by raising said pressure actuated conveyor means against said rinsing vessel and reopening said fluid valve means.

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**3,964,527**

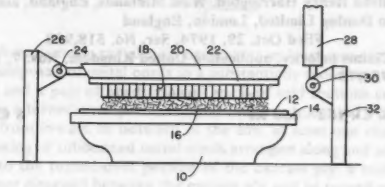
## METHOD AND APPARATUS FOR FILLING SPACING CORE

**Robert L. Zwart, Cypress, Calif., assignor to McDonnell Douglas Corporation, Long Beach, Calif.**

**Continuation of Ser. No. 204,101, Dec. 2, 1971, abandoned. This application May 24, 1974, Ser. No. 473,008**

**Int. Cl.² B65B** *31/00*

**U.S. Cl. 141—8** **3 Claims**




1. A method for filling spacing core with fibrous material comprising the steps of:
   1. placing a layer of compressible fibrous material on a flat base,
   2. placing a sheet of rigid open cell core stock on said fibrous material,
   3. placing a weight over said core stock,
   4. vibrating said base until the lower edges of said core stock cut through said layer of fibrous material so that the resulting cut portions of said compressible fibrous material expands into the open cells of said cell core stock and,
   5. subjecting said core stock to a partial vacuum from the top thereof to uniformly fill the cells of said core with cut portions of said fibrous material.

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**3,964,528**

## CATALYST CHANGING SYSTEM

**Harold Smithson, Westtown, and John F. Stahl, Exton, both of Pa., assignors to Oxy-Catalyst, Incorporated, West Chester, Pa.**

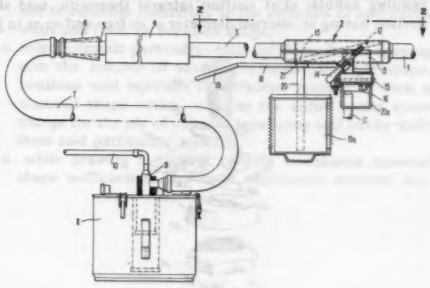
**Filed May 10, 1974, Ser. No. 468,746**

**Int. Cl.² B65B** *1/08*

**U.S. Cl. 141—67** **23 Claims**

1. In a system for exchanging catalytic particles in a horizontally disposed catalytic exhaust converter having external longitudinal flanges containing a catalyst bed and a bottom fill hole therein, said system having at least one canister assembly constructed and arranged to selectively receive or supply said catalytic particles, vacuum means for creating negative pressure within said converter, means supported from said converter arranged to engage said canister assembly in connection with said fill hole, and means for shaking said converter,

the improvement wherein said shaking means is fixedly carried by a removable gripping means arranged to selectively engage said converter at spaced-apart points along a transverse line which is longitudinally spaced from said fill hole, said gripping means comprising a transverse first supporting member spacedly suspended from said converter, a second supporting member affixed to and extending upwardly from said first supporting member, and a second gripping member pivotally attached to and



extending upwardly from said second supporting member, said gripping members having their upward ends shaped for engagement with said flanges.

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**3,964,529**

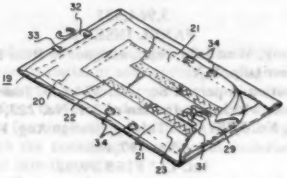
## PURSE KIT

**William F. Brod, 236 Wildwood Ave., Pitman, N.J. 08071**

**Continuation-in-part of Ser. No. 188,683, Oct. 4, 1971, abandoned. This application Jan. 18, 1973, Ser. No. 324,856**

**Int. Cl.² B65D** *3/00*

**U.S. Cl. 150—32** **1 Claim**




1. A purse kit permitting the purchaser of the kit to assemble a hand purse having an outside covering material chosen and supplied by the purchaser including:
   - a substantially flat stiffening member prescored to permit subsequent folding into a purse configuration having at least front, back and closure panels and adapted to be covered on one side by the purchaser's choice of covering material;
   - a preformed liner having a first panel of peripheral configuration approximating the peripheral configuration of the stiffening member and adapted to be secured to the stiffening member on the opposite side thereof from the covering material and including two side panels each formed of an inwardly folded flap secured along one edge at opposite edges of the liner and each including securing means along the opposite edge thereof which permits the liner to be disposed flat while being secured to the stiffening member and to form a pocket by folding engagement of the opposite edge of each flap with itself as the stiffening member is folded into purse configuration.

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**3,964,530**

## LOCKING CUP WASHER

**Lawrence H. Nickles, Indianapolis, Ind., assignor to General Motors Corporation, Detroit, Mich.**

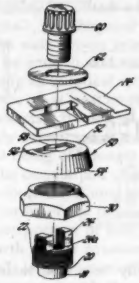
**Filed May 30, 1972, Ser. No. 257,885**

**Int. Cl.² F16B** *39/08*

**U.S. Cl. 151—29** **5 Claims**

1. In combination with a threaded fastener having a tang at its free end and a nut having flat side surfaces meeting at

corner edges to define a polygonal periphery thereabout, threaded thereon, a nut lock of deformable material having an annular base portion with a slot therein slidably received over the tang in locking engagement therewith and having a depending annular skirt portion integral therewith, said skirt portion having an internal diameter at its free end so as to just



engage over the corner edges of the nut and, means including threaded means secured to said threaded fastener for moving said nut lock axially on said threaded fastener to move said skirt portion further over said nut while deforming said skirt portion around said corner edges of said nut and to retain said nut lock as then deformed axially on said threaded fastener relative to said nut.

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**3,964,531**

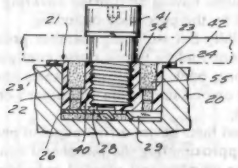
## PANEL INSERT

**Peter Schenk, West Islip, N.Y., assignor to Dzus Fastener Co., Inc., West Islip, N.Y.**

**Continuation-in-part of Ser. No. 374,345, June 28, 1973, abandoned, which is a division of Ser. No. 223,455, Feb. 4, 1972, Pat. No. 3,781,961. This application Aug. 14, 1974, Ser. No. 497,465**

**Int. Cl.² F16B *39/02***

**U.S. Cl. 151—41.7** **7 Claims**



**1.** A small insert adapted for single use to be mounted in a thin lightweight panel of low density core material to form a fastener receptacle for interengagement with a fastener element comprising:

a body portion having a forward end for insertion into the panel and a rear end;

a single use cutting surface on the forward end for forming a recess in the panel to receive the insert when a predetermined force is applied to the insert in order to position the insert through a substantial cross section of the panel without the necessity of preforming the recess;

surfaces forming at least one passageway through the insert in alignment and in communication with the cutting surface and extending to the rear end of the inset for conducting material removed from the panel in forming the recess from the cutting surface to beyond the panel surface independent of other forces when the insert is positioned within the panel so as to permit the recess to be formed as the insert is simultaneoulsy positioned in the panel;

the surfaces forming at least one passageway including a beveled portion to facilitate guidance and removal of material from the insert end panel without the necessity of the application of additional force while the predetermined force is being applied to the insert to position the insert in the panel;

surfaces on the insert forming openings to receive a potting compound while the insert is positioned in the recess to mount the insert therein;

means on the insert adapted to be releasably engaged by insertion means so that the insert may be held in the desired manner during insertion and fastening in the panel and then released thereafter prior to assembly with the fastened element; and

receiving surfaces on the insert adapted for interengagement with the fastener element.

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**3,964,532**

## PNEUMATIC TIRES

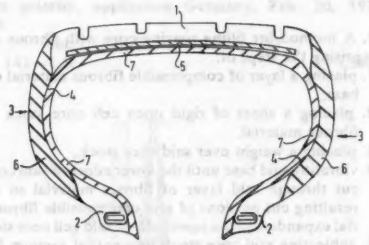
**Wilfred Henry Harrington, West Midlands, England, assignor to Dunlop Limited, London, England**

**Filed Oct. 29, 1974, Ser. No. 518,998**

**Claims priority, application United Kingdom, Nov. 7, 1973, 51754/73**

**Int. Cl.² B60C *17/00***

**U.S. Cl. 152—330 RF** **8 Claims**



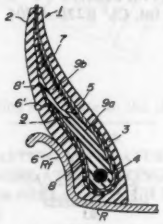
**1.** A pneumatic tire having an aspect ratio in the range 50 – 75% and comprising a tread portion having a substantially flat ground contacting surface, beads and sidewalls, said sidewalls including rubber compounds of resilience greater than 85% measured by the Dunlop Pendulum Test at 50°C, the beads of the tire comprise rubber compound having a hardness greater than 70 Shore A and a resilience of greater than 60% as measured by the Dunlop Pendulum Test at 50°C, the tread portion being braced by a breaker assembly and having a width, when the tire is in use and inflated, less than the overall tire section width, the overall tire section width being a maximum in the mid-sidewall region of the tire, but at least 20% wider than the distance between the heels of the beads, the sidewalls each having a thickness at their thinnest part of at least 5% of the overall tire section width, the tire containing a carcass reinforcement consisting of a single layer ply of substantially radially extending textile cords extending from one tire bead to the other, and the carcass is made of cords comprising a heat resistant textile selected from the class consisting of rayon and aromatic polyamide fibers.

3,964,533

## PNEUMATIC RADIAL TYPE TIRE HAVING AN IMPROVED DURABILITY IN BEAD SECTION

Iwao Arimura, Kodaira; Akio Sato, Higashi-Murayama, and Hironori Hirano, Akigawa, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Filed Feb. 21, 1975, Ser. No. 551,951
Claims priority, application Japan, Feb. 28, 1974, 49-22880
Int. Cl.² B60C 15/06, 9/10
U.S. Cl. 152—362 R 14 Claims



1. A pneumatic radial type tire having at least one carcass ply composed of metal cords in a substantially radial arrangement and a pair of bead sections, each of said sections comprising a turned-over portion folded carcass ply around a bead core from inward to outward of the tire, at least one chafer consisting of rubberized metal cords arranged along and adjacent to the turned-over portion of the carcass ply, a rubber stiffener disposed between the carcass ply and its turned-over portion with the chafer and extending outwardly from the vicinity of the bead core beyond outermost cord ends of the turned-over portion and of the chafer in radial direction of the tire, and a carcass reinforcing member composed of at least two rubberized cord fabrics or organic fibers secured to the surface of the carcass ply and being crossed with each other in their laminate interface; said carcass reinforcing member being located opposite to the outermost cord ends of the turned-over portion of the carcass ply and of the chafer in radial direction of the tire by a given width and having a cord angle of at least 60° with respect to the direction of the cord of the carcass ply in each cord fabric, said angle being larger at the outer portion than at the inner portion in radial direction of the tire, and said rubber stiffener disposed between the turned-over portion of the carcass ply with the chafer and the carcass secured with the carcass reinforcing member being composed of a composite of a hard rubber stock in the side of the turned-over portion and a composite of a relatively soft rubber stock, the difference in hardness between the hard rubber stock and the soft rubber stock being more than 10 of Shore A hardness, in the side of the carcass reinforcing member, the relatively soft rubber stock extending along the carcass reinforcing member from its corresponding inside portion to outward beyond upper portion thereof in radial direction of the tire to protect the outermost cord ends of the turned-over portion and the chafer from distortion of the stiffener which yields by pressure between the carcass ply and a rim flange and from divergence between the cords of the carcass ply when the inflated radial type tire is subjected to service under load.

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3,964,534

## CASTING METHOD WITH A VACUUM BONDED DRY SAND CORE

Stephen Rabinowitz, Huntington Woods, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Mar. 4, 1974, Ser. No. 448,159
Int. Cl.² B22C 15/22; B22D 29/00
U.S. Cl. 164—7 8 Claims

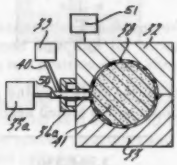
1. A method of casting an object requiring cored inserts:

a. prepare core box elements having walls for defining a core cavity with an opening at one location,

b. insert a consumable impermeable thin ply of continuous material onto and throughout said cavity walls in a manner to conform identically to the contours of said cavity walls and form an enclosed shape,

c. inject ceramic particulate material through said opening into the interior of said impermeable thin ply shape, continue said injection in sufficient quantity to form a material shape which occupies the entire cavity space except for the ply of material separating said cavity walls from said particulate material,

d. while drawing a vacuum on said continuous material shape sufficient to draw the continuous material inti-



mately about the sand shape, permanently close said continuous material at said opening through which said sand is inserted so that the particulate material will not deviate from the intended outer contour of said core, said assembly forming a tight durable self-supporting wrapped core with the consumable continuous material forming the outer skin thereof,

e. place said wrapped core shape into a porous molding cavity and introduce molten metal to displace said consumable continuous material and define a casting thereabout, and

f. subsequent to definition of the casting, disintegrate said particulate material by impact strip from the interior of said casting.

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3,964,535

## STOPPER ROD TAPPING ASSEMBLY AND FILAMENT FORMING PROCESS

John R. Bedell, Sparta, and Robert W. Smith, Flanders, both of N.J., assignors to Allied Chemical Corporation, New York, N.Y.

Filed Feb. 20, 1975, Ser. No. 551,557
Int. Cl.² B22D 11/10
U.S. Cl. 164—66 2 Claims

1. Metal filament forming apparatus comprising:

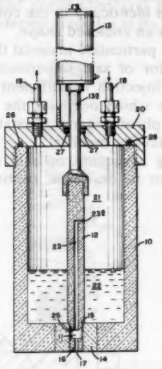
a. a top-sealed crucible provided with a chamber adapted to contain molten metal and including a tapping orifice and nozzle in the bottom thereof;

b. means for introducing inert gas under pressure into the upper part of said chamber;

c. a stopper rod mounted in said crucible provided with an interior channel extending within the crucible from an egress vent in communication with said chamber above the surface of the molten metal to the bottom tip of the stopper rod;

d. means for raising and lowering the stopper rod so as to open and close the orifice; and

e. a valve seat surrounding the orifice for seating the stopper rod and closing the orifice, whereby undesired residues



are flushed from the orifice by the pressurized inert gas when the stopper rod is seated against the valve seat.

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**3,964,536**

## METHOD FOR FIXING A METALLIC ARMATURE OF A NON-METALLIC PART

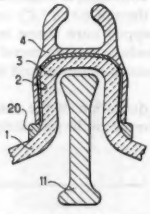
**Michel Willem, Cusset, France, assignor to Ceraver, Paris, France**

**Filed Dec. 11, 1973, Ser. No. 423,825**

**Claims priority, application France, Dec. 12, 1972, 72.44170**

**Int. Cl.² B22D *19/00***

**U.S. Cl. 164—98** **2 Claims**



1. A method of fixing a metallic connecting cap of an electrical insulator of the rod-and-cap type on a non-metallic part, said metallic connecting cap comprising a lower part to be fitted around the nonmetallic dielectric part and an upper part containing a cavity for receiving the lower part of a rod, said method comprising the steps of:

1. Closely applying a first thin metallic part
   a. to at least a part of the outer surface of said nonmetallic dielectric part on which said lower part of a first metallic connecting cap is to be fixed,
   b. Which is in the form of a sleeve made of a metal which is a good conductor of heat,
   c. which is crimped on the surface of said non-metallic dielectric part on which said first metallic connecting cap is to be fixed, and
   d. the edge of which is in the form of a flange which functions as a seal between the mould and said nonmetallic dielectric part, thus limiting the mould volume, and

2. moulding said first metallic connecting cap on said first thin metallic part while the material of which said first metallic connecting cap is to be composed is in the melted state.

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**3,964,537**

## METHOD FOR PRESSURE CASTING

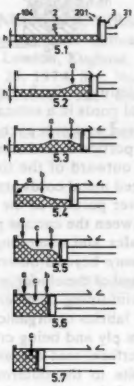
**Peter Koch, Niederuzwil, and Eduard Beyer, Gossau, both of Switzerland, assignors to Gebrueder Buehler AG, Switzerland**

**Filed Oct. 3, 1974, Ser. No. 511,801**

**Claims priority, application Switzerland, Oct. 8, 1973, 14300/73; May 3, 1974, 6026/74**

**Int. Cl.² B22D *17/04***

**U.S. Cl. 164—136** **16 Claims**



1. In a method of pressure casting, into a mold cavity, a melt quantity metered out in accordance with the volume of the cavity, by diminishing a space, receiving the metered quantity and extending between a casting gate, leading into the mold cavity, and a filling inlet in two-phase manner including a shot pre-filling phase followed by a mold-filling phase, the improvement comprising, in the shot pre-filling phase, diminishing such space by moving the metered quantity of melt toward the casting gate at an accelerating rate continuously throughout the shot prefilling phase so as to prevent formation of a standing wave and to maintain the casting gate clear of melt; and, in the mold-filling phase, beginning when the melt has reached the casting gate and immediately following the shot pre-filling phase, diminishing such space to a minimum by displacing the metered quantity of melt from such space into the mold cavity.

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**3,964,538**

## CORE BOX MOUNTING PLATES IN A SHELL CORE MACHINE

**Harry Noordhof, Grand Haven, Mich., assignor to Lucille E. Noordhof, Grand Haven, Mich.**

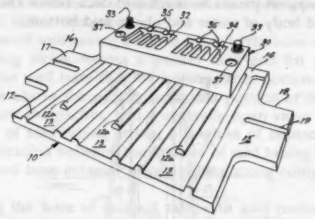
**Filed May 22, 1975, Ser. No. 579,954**

**Int. Cl.² B22C *7/06, 13/12***

**U.S. Cl. 164—228** **10 Claims**

1. In a shell core machine, a pair of core box mounting plates, each of which comprises:

a plate including a plurality of spaced ribs extending from a surface thereof to define exhaust channels therebe-



tween; and

means for mounting said plate to the shell core machine.

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**3,964,539**

**PRESSURE DIE CASTING APPARATUS PROVIDED WITH A PRESSURE ATTENUATING DEVICE**

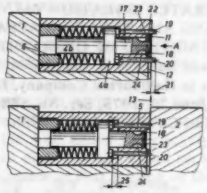
**Fritz Hodler, Chemin du Chatagny 3, CH 1842 Montreux-Territet, Switzerland**

**Filed June 4, 1975, Ser. No. 583,664**

**Claims priority, application Germany, June 21, 1974, 24-29920**

**Int. Cl.² B22D** *17/32*

**U.S. Cl. 164—303** **5 Claims**



1. A pressure die casting block comprising two block halves assembled together along a plane defining a parting plane of the blocks to provide an internal cavity for performing a casting operation, a device disposed in one of the block halves for damping pressure forces which occur in the block due to pressure surges during a casting operation, said device having a piston which is slidingly guided in a guide cylinder and biased by the action of a spring system for absorbing the pressure forces, said piston being provided with a constriction in the region of its crown, said constriction being disengageable from the front edge of the guide cylinder nearest to the block parting plane when the block halves are disassembled and by the provision of operating means which return the piston into a stand-by position when the block halves are in the assembled condition so that the constriction is situated completely in the guide cylinder, the crown being retracted by a few tenths of a millimeter from a front edge of the guide cylinder.

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**3,964,540**

**MOLDING SYSTEM**

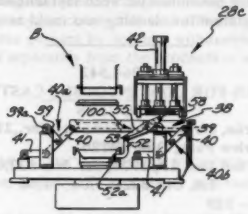
**Edward D. Abraham, 6695 Farview Road, Brecksville, Ohio 44141**

**Filed Jan. 2, 1974, Ser. No. 429,544**

**Int. Cl.³ B22D** *5/04;* **B25J** *3/04;* **B65G** *47/74*

**U.S. Cl. 164—323** **24 Claims**

1. In a molding system, apparatus for moving a flask from one portion of a conveyor system and for transferring it therefrom and depositing a mold at another portion of the conveyor system, said apparatus comprising a first structure located between said portions for picking up the flask from the one portion of the conveyor system, a feeder adjacent said first structure for a flask and a mold and movable transverse of the conveyor system toward and away from said portions of the conveyor system, means supporting said first structure for movement from a flask pickup position to a position where a flask is deposited on said feeder, means supporting said feeder for said transverse movement to move the flask to a molding station and to transfer a mold to a mold removal station, a second structure located adjacent said feeder for picking up



the mold from said feeder at said mold removal station, means supporting said second structure for movement from said mold removal station to a position where the mold is deposited on the other portion of the conveyor system, a fluid cylinder, and means interconnecting said fluid cylinder with said first and second structures and said feeder to effect said movements of said first and second structures and said feeder upon operation of said fluid cylinder.

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**3,964,541**

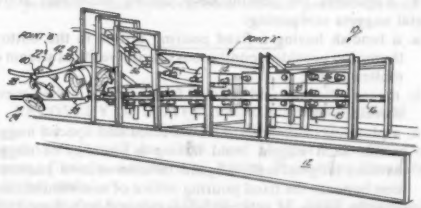
**APPARATUS FOR METAL CASTING**

**Donald G. Brunner, Waupaca, Wis., assignor to The Budd Company, Troy, Mich.**

**Filed June 10, 1974, Ser. No. 478,014**

**Int. Cl.² B22D** *5/04;* **B29C** *3/02*

**U.S. Cl. 164—323** **3 Claims**



1. A molten metal casting apparatus comprising support means, a lower continuous closed track mounted on said support means, an upper track portion aligned with said lower track and mounted on said support means above said lower track, a plurality of mold assemblies each mold assembly includes a cope, a drag matingly supporting said cope, said drag being supported on said lower track by a plurality of said support arms and said cope having a plurality of said support arm for cooperating with said upper track portion for removal of said cope for said drag, a cavity formed between said drag and said cope, an aperture in said cope extending between said cavity and the outer surface thereof, a destructible mold liner positioned and supported within said cavity having an outer surface matingly engaging and being supported by said cavity, said mold liner including a pouring basin extending through said aperture for receiving and conducting molten metal into said mold liner, and an inner cavity in said mold liner in communication with said pouring basin for receiving the molten metal and confining the molten metal until it solidifies, a plurality of support arms extending from each of said mold assemblies for mounting said mold assemblies on said tracks and cooperating therewith for movement there along, a plurality of stations along said tracks, means for moving said

mold assemblies along said tracks to said stations, said stations including a loading station for placing a mold liner within each of said mold assemblies, a pouring station adjacent said assembly station for pouring molten metal within the mold liner, a cooling station adjacent said pouring station for holding the mold assemblies while the molten metal solidifies, an unloading station adjacent said cooling station for removing the mold liner with solidified casting from said mold assemblies, and a cleaning station positioned between said unloading station and said loading station for cleaning said mold assemblies.

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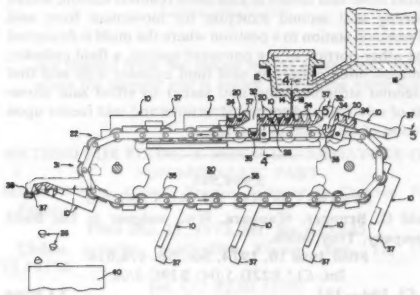
**3,964,542**

## APPARATUS FOR CONTINUOUSLY CASTING METAL NUGGETS

**Richard Skurko, c/o Garfield Company, Inc.,21862 Cromwell Ave., Fairview Park, Ohio 44126**

**Filed Dec. 13, 1974, Ser. No. 532,627**
**Int. Cl.² B22D** *5/04, 11/06*
**U.S. Cl. 164—329** **16 Claims**



1. Apparatus for continuously casting individual active metal nuggets comprising:

a. a tundish having a fixed pouring orifice in the bottom thereof to provide a continuous narrow veritical stream of molten metal;

b. means adjacent said tundish for directing molten metal thereto, and

c. a plurality of consecutive connected and spaced nugget molds each nugget mold having a plurality of nugget cavities longitudinally aligned for consecutive presentation beneath the fixed pouring orifice of said tundish, said cavities being of substantially greater depth than width and being positioned with respect to each other to minimize the top surface of said mold exposed to said tundish pouring orifice; each said nugget mold further including intercepting means comprising a subjacent stepped portion integrally secured to the front wall of each said mold, the top surface of said stepped portion being positioned beneath the top surface of said molds, and a nugget cavity in said stepped portion in longitudinal alignment with said plurality of nugget cavities whereby the flow of molten metal between consecutive molds is intercepted.

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**3,964,543**

## UNDERWATER WELLHEAD COMPLETIONS WITH PORTABLE ATMOSPHERIC CELLAR

**James T. Rodgers, New Orleans, La., assignor to Standard Oil Company (Indiana), Chicago, Ill.**

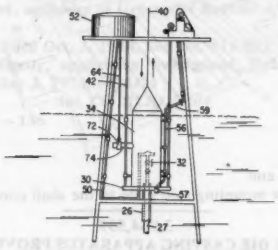
**Filed Nov. 18, 1974, Ser. No. 525,046**
**Int. Cl.² E21B** *43/01*
**U.S. Cl. 166—.5** **7 Claims**

1. A marine installation for producing fluids from an underground reservoir beneath the bottom of a body of water which comprises:

a deck;

support means supporting said deck above said body of water;

a wellhead base impermeable to water and supported by said support means beneath said deck below the surface of said body of water and above said bottom;



a wellhead supported on said wellhead base;

a producing line from said wellhead to said deck;

a portable cellar for placing over said wellhead, the lower edge of said cellar forming a watertight seal at said wellhead base; and

a flowline from said wellhead to said underground reservoir.

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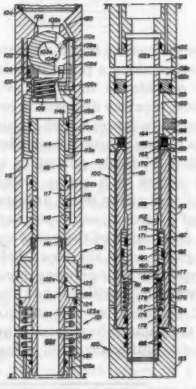
**3,964,544**

## PRESSURE OPERATED ISOLATION VALVE FOR USE IN A WELL TESTING AND TREATING APPARATUS, AND ITS METHOD OF OPERATION

**David L. Farley, and Burchus Q. Barrington, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.**

**Filed June 20, 1975, Ser. No. 588,990**
**Int. Cl.² E21B** *43/00, 49/00*
**U.S. Cl. 166—315** **12 Claims**



1. A valve for use in a tubing string located in an oil well bore and having a packer arranged for selectively sealing the well bore thereby isolating that portion of the oil well bore above the packer from that portion of the oil well bore below the packer, comprising:

valve means, incorporated in the wall of said tubing string and having a normally open position and a closed position, for controlling fluid communication between the interior of said tubing string and the oil well bore exterior of said tubing string;

pressure responsive operating means, operably connected to said valve means, for moving said valve means from the normally open position to the closed position when the pressure in that portion of the well bore above said

packer is increased by a specified amount over the pressure in that portion of the well bore below the packer; and means within said operating means, for maintaining said valve means in the closed position responsive to subsequent increases in the pressure in that portion of the well bore below the packer.

9. In an oil well having a tubing string in the bore of the well, said tubing string having a packer arranged for selectively sealing the well bore thereby isolating that portion of the oil well bore above the packer from that portion of the oil well bore below the packer, and a normally open valve located in the wall of said tubing string; a method of controlling fluid communication between the interior of said tubing string and the oil well bore exterior of said tubing string comprising the steps of:

sealing the bore of said oil well with said packer thereby isolating that portion of the oil well above the packer from that portion of the oil well below the packer;

increasing the pressure in that portion of the oil well bore above the packer, thereby creating a pressure differential between that portion of the well bore above the packer and that portion below the packer;

closing said normally open valve responsive to said pressure differential, thereby interrupting fluid communication between the interior of said tubing and the oil well bore exterior of said tubing;

additionally increasing the pressure in that portion of the oil well bore above the packer;

creating a second pressure responsive to said additional pressure increases whose value is a predetermined amount less than said pressure in that portion of the bore above the packer;

increasing the pressure in that portion of the oil well bore below the packer to a value higher than said second pressure; and,

maintaining said valve in the closed position responsive to the pressure differential between said pressure in that portion of the well above the packer and said second pressure, and nullifying the effect on said valve of said pressure increases in that portion of the bore below the packer, thereby allowing said pressure in that portion of the bore below the packer to be increased as desired.

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**3,964,545**

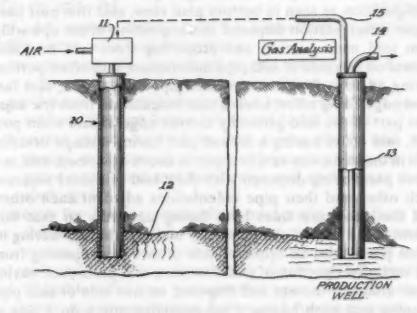
## PROCESSES FOR SECONDARILY RECOVERING OIL

**Frank N. Speller, Jr., Tyler, Tex., assignor to Esorco Corporation, Boston, Miss.**

**Continuation-in-part of Ser. No. 309,063, Nov. 24, 1972, abandoned. This application June 10, 1974, Ser. No. 477,846**

**Int. Cl.² E21B *43/00, 43/24***

**U.S. Cl. 166—256** **5 Claims**




1. The method of secondary recovery of oil from a reservoir including the steps of injecting air in a reservoir at a point spaced from a production well, maintaining the volume and pressure of the injected air so that a reservoir pressure of at least 500 p.s.i.g. is maintained, causing oxidation of reservoir material which results in the production of an effluent gas containing oxygen and carbon dioxide, reducing the surface tension of said oil in the reservoir by dissolving the carbon dioxide in the reservoir oil to render the high-gravity, paraffin-base oils more mobile and susceptible of being driven to the production well, keeping the dissolved carbon dioxide in the oil by maintaining said pressure and volume of the injected air, controlling the oxygen content of said effluent gas to a level of less than three percent by volume, withdrawing said effluent gas and oil separately from the production well.

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**3,964,546**

## THERMAL RECOVERY OF VISCOUS OIL

**Joseph C. Allen, Bellaire, Tex., assignor to Texaco Inc., New York, N.Y.**

**Filed June 21, 1974, Ser. No. 481,580**

**Int. Cl.² E21B *43/24***

**U.S. Cl. 166—261** **9 Claims**

1. In the method of in-situ combustion for recovering heavy oils and bitumen from subterranean hydrocarbon-bearing formations traversed by at least one injection well and at least one production well and having a low permeability, the improvement comprising:

a. injecting into said formation via said injection well a mixture of an oxygen-containing gas and steam to effect a controlled low-temperature combustion in the range of temperature from about 400° to about 800°F thereby heating said formation and establishing a gas saturation therein,

b. terminating injection of said steam and continuing injection of said oxygen-containing gas to initiate an in-situ combustion in the vicinity of said injection well,

c. continuing injection of said oxygen-containing gas to propagate said in-situ combustion through said formation toward said production well,

d. producing said hydrocarbons via said production well.

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**3,964,547**

## RECOVERY OF HEAVY HYDROCARBONS FROM UNDERGROUND FORMATIONS

**Karol L. Hujsak, Tulsa, Okla., and Thomas S. Buxton, Calgary, Canada, assignors to Amoco Production Company, Tulsa, Okla.**

**Continuation of Ser. No. 323,542, Jan. 15, 1973, abandoned. This application Oct. 29, 1974, Ser. No. 518,680**

**Int. Cl.² E21B *43/16***

**U.S. Cl. 166—269** **2 Claims**

1. A method of injecting both a heating fluid and an insulating fluid and producing a heated hydrocarbon through a single well drilled through a formation having an upper high permeability part lean in hydrocarbons, and a lower low permeability part rich in hydrocarbons which comprises:

a. establishing within said single well a first channel extending from the surface to said lower part of said formation,

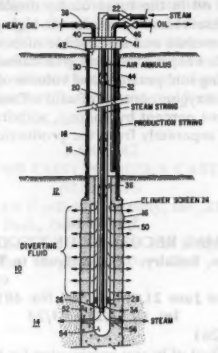
b. establishing a second channel within said well surrounding the first channel and extending from the surface to an upper part of said formation, said second channel having no fluid communication within said well with said first channel;

c. injecting a heating fluid through said first channel to said lower part of said formation to heat the hydrocarbons therein;

d. injecting an insulating fluid through said second channel into said upper part of said formation simultaneously with the injection of said heating fluid to insulate said upper part of said formation from said heating fluid in said first channel, and to block the upward flow of said heating

fluid in said formation;

e. establishing a producing channel through said said single well extending from the surface to said formation and producing hydrocarbons through said producing channel.

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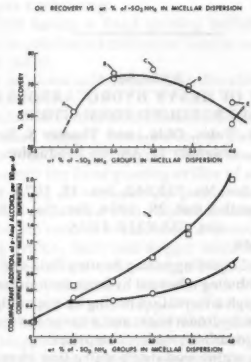
**3,964,548**

## METHOD FOR OIL RECOVERY BY FLOODING WITH MICELLAR DISPERSIONS CONTAINING CRUDE OIL SULFONATES

**Donald E. Schroeder, Jr.; Mark A. Plummer, and Wayne O. Roszelle, all of Littleton, Colo., assignors to Marathon Oil Company, Findlay, Ohio**

**Filed Mar. 27, 1975, Ser. No. 562,520**
**Int. Cl.² E21B *43/22***
**U.S. Cl. 166—273** **19 Claims**


OIL RECOVERY VS wt % of -SO3NH4 IN MICELLAR DISPERSION
% OIL RECOVERY
wt % of -SO3 NH4 GROUPS IN MICELLAR DISPERSION
COSURFACTANT ADSORPTION, mg of Aerosol AY/gm of Berea rock
COSURFACTANT WEIGHT PERCENT IN MICELLAR DISPERSION
wt % of -SO3 NH4 GROUPS IN MICELLAR DISPERSION

**1.** In a process for recovering hydrocarbon from a subterranean formation having at least one injection means in fluid communication with at least one production means and wherein a micellar dispersion comprised of water, hydrocarbon, cosurfactant, electrolyte, and petroleum sulfonate obtained by sulfonating whole or topped crude oil is injected into the formation and displaced toward the production means to recover therethrough and wherein the cosurfactant concentration is present in excess of that concentration required to produce in the micellar dispersion a viscosity maximum, the improvement comprising incorporating within the micellar dispersion about 1.5 to about 4.5 weight percent of active sulfonate groups which are attached to the petroleum sulfonate within the micellar dispersion and thereafter injecting the micellar dispersion into the formation.

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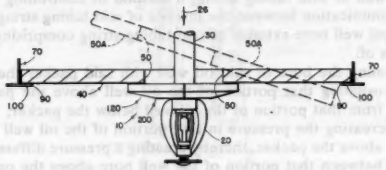
**3,964,549**

## FIRE SPRINKLER AND CEILING PANEL ASSEMBLY

**Paul F. McGill, 2298 Country Club Ave., Omaha, Nebr. 68104**

**Filed Nov. 8, 1974, Ser. No. 522,256**
**Int. Cl.² A62C *37/10***
**U.S. Cl. 169—37** **7 Claims**



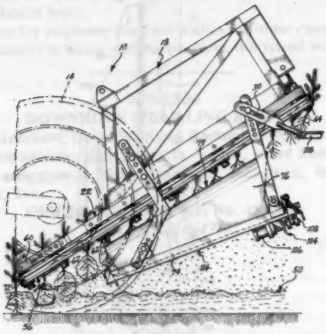
**1.** A fire sprinkler and panel ceiling assembly comprising: a fire sprinkler head having a construction for spreading a fire prevention fluid over a wide area, a vertical pipe attached to and carrying said fluid to said head, a horizontal ceiling panel having a head passage extending vertically therethrough, a panel supporting assembly having a panel opening extending generally vertically therethrough, said supporting assembly having panel-engaging portions extending under edges of said panel and supporting said panel and disposed at edges of said panel opening, and said head passage hole being large enough to permit a tilting and a rotating of said panel with respect to said panel opening and a passing of said panel down over said head for removal of said panel from the remainder of said assembly, and a panel hole cover having a perforation therethrough receiving said pipe and of a size as measured in a horizontal plane which latter size is large enough to substantially cover said head passage hole as seen from therebeneath except for the portion of said perforation occupied by said pipe, said cover having a plurality of separable parts so that said cover can be removed from said pipe by movements of certain parts of said cover in directions laterally of said vertical pipe, disconnectable means holding said cover parts together in a manner permitting sufficient separation of said cover parts for removing said cover from said pipe in directions other than vertically off of an upper portion of said pipe; said cover comprising a first part having a main portion having a concave undersurface and having a pipe reception indentation disposed substantially centrally of one side thereof as seen in bottom plan view for receiving a part of said pipe, the other side of said main portion having a generally convex edge configuration as seen in bottom plan view, said first part having an offset portion disposed in use position offset upwardly from said main portion and projecting from said one side thereof on one side of said pipe indentation, said offset portion having an edge farthest from said pipe indentation, said farthest edge being offset toward said indentation from the adjacent part of the said generally convex edge of said main portion, said cover having a second part having a shape describable in the same way said first part is above described, said two cover parts being disposed with their said one sides adjacent each other and their pipe indentations adjacent each other, and their concave sides both facing upwardly so that said indentations from a pipe opening, said second part having its offset portion on an opposite side of said pipe opening from the said offset portion of said first part, said parts each having a tab attached thereto and disposed on one side of said pipe opening and each having a tab-receiving notch on a side of said pipe opening which is opposite to said tab, said tabs extending downwardly through said notches respectively whereby said cover parts are substantially limited as regards horizontal movements with respect to each other.

3,964,550

## TREE SEEDLING HARVESTER

James G. Storms, Garfield, Wash., assignor to J. E. Love Company, Garfield, Wash.

Filed Sept. 16, 1974, Ser. No. 506,292
Int. Cl.² A01D 25/00
U.S. Cl. 171—61 15 Claims



1. In a mobile device for harvesting seedlings including means for subsurface cutting to loosen the earth adjoining the roots of said seedlings, means for grasping the seedlings and pulling them out from the loosened earth and then conveying them along a path to a receiver, and means for removing the earth from the roots of said seedlings, the improvement comprising:

said means for removing the earth from the roots of said seedlings comprising an elongated root beater means extending along one side of the path of travel of the seedlings, means supporting said root beater means for oscillatory movement in a direction substantially transverse to both the longitudinal axis of said beater means and the path of travel of said seedlings, and drive means for oscillating said root beater means an amount such that root beater means makes slapping contact with the roots of each seedling passing by said root beater means, to in that manner dislodge earth from the roots of the seedling.

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3,964,551

## PNEUMATIC IMPACT DRILLING TOOL

Grey Bassinger, San Antonio, Tex., assignor to Reed Tool Company, Houston, Tex.

Filed Sept. 20, 1974, Ser. No. 507,968
Int. Cl.² E21B 21/00
U.S. Cl. 173—73 14 Claims

1. An impact drilling tool for connection in a string of drilling pipe, said tool comprising:

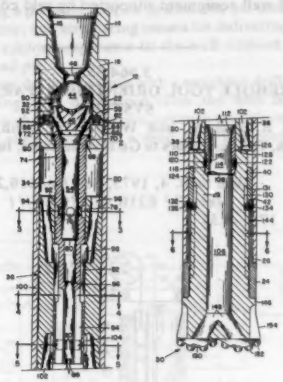
an upper sub for connection to said drilling pipe; a casing with an upper end connected to said upper sub;

anvil means slideably received in a lower end of said casing, said anvil means being connected to bit means;

hammer means carried in said casing above said anvil means, said hammer means reciprocating along the elongated axis of said tool for striking said anvil means during each cycle;

means for feeding pressurized pneumatic fluid from said drilling pipe through the center portion of said hammer means, said feeder means being retained by said upper sub and extending downwardly therefrom for providing slideable valve type passages that open and close on each cycle for pressurization below said hammer means, for pressurization above said hammer means, and for exhaust above said hammer means; and

exhaust means carried by said anvil means and located between said hammer means and said anvil means for exhausting during each cycle the pressurization below said hammer means through a space separating said feeder means and said exhaust means and subsequently



exhausting through said exhaust means to said bit means, said feeder means terminating above said exhaust means to form said separating space.

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3,964,552

## DRIVE CONNECTOR WITH LOAD COMPENSATOR

Damon T. Slator, Houston, Tex., assignor to Brown Oil Tools, Inc., Houston, Tex.

Filed Jan. 23, 1975, Ser. No. 543,329
Int. Cl.² E21B 3/00
U.S. Cl. 173—164 22 Claims

1. A well drilling or completion system for manipulating well equipment comprising:

a. a power drive assembly for providing rotary and vertical movement in a well derrick;

b. a longitudinally extending output shaft means rotatably powered by said power drive assembly and movable vertically therewith;

c. a connector assembly carried by said power drive assembly and rotatably powered thereby, for carrying and supporting weight of said well equipment;

d. elevator means included in said connector assembly for engaging said well equipment; and

e. load compensating means included in said connector assembly for cushioning and supporting said weight of said well equipment supported by said connector assembly.

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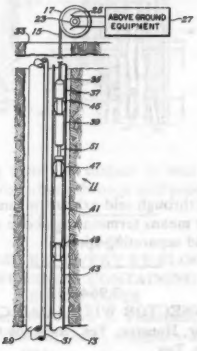
## 3,964,553
## BOREHOLE TOOL ORIENTING APPARATUS AND SYSTEMS

**Edward R. Basham, and William D. Smith, both of Fort Worth, Tex., assignors to Go International, Inc., Fort Worth, Tex.**

**Filed Sept. 4, 1975, Ser. No. 610,284**
**Int. Cl.² E21B *43/119*, *43/11***
**U.S. Cl. 175—4.51** **12 Claims**




1. Borehole tool orienting apparatus comprising:

a. a downhole assembly and means for lowering same to a predetermined depth in a borehole; said downhole assembly including:

i. a permanent magnet assembly made up of one or more permanent magnets,

ii. means for imparting motion to said permanent magnet assembly to generate a moving magnetic field,

iii. receiver means disposed in relation to said moving magnetic field so that substantially no signals are induced therein under the condition when said moving magnetic field is substantially undistorted but measurable signals may be induced therein under the condition when said moving magnetic field is distorted due to the presence of a ferrous anomaly,

iv. means for rotating said receiver means to produce an azimuthal scan whereby there is induced in said receiver means signals which are a function of the azimuthal location of a ferrous anomaly.

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## 3,964,554
## TEMPERATURE-REGULATED, SEALED BEARING SYSTEM FOR ROCK DRILL BITS

**Robert E. Ricks, Los Angeles, and William P. Robinson, Palos Verdes, both of Calif., assignors to Smith International, Inc., Newport Beach, Calif.**

**Filed Dec. 30, 1974, Ser. No. 537,191**
**Int. Cl.² E21B *9/08***
**U.S. Cl. 175—17** **6 Claims**

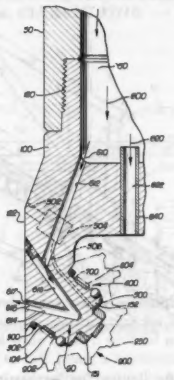
1. A rock drill bit assembly adapted for boring in the earth, and comprising:

a rock drill main body having at least one journal;

a cone disposed about said journal and adapted to rotate relative thereto, said journal and cone having opposing facial surfaces, portions of which mutually define a clearance space therebetween;

bearing means positioned within said clearance space for rotatably supporting said cone relative to said journal; and

heat exchange means for inducing the transfer of heat between said journal and a circulating fluid, said heat exchange means including a passageway within said journal



for conducting said circulating fluid through said journal, said passageway being in close proximity to but physically separated from said opposing facial surfaces, and further including an expansion chamber means for permitting the thermodynamic expansion of said circulating fluid to increase the cooling capacity of said heat exchange means.

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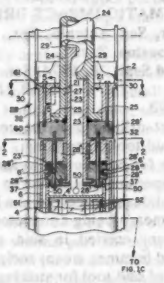
## 3,964,555
## APPARATUS FOR OBTAINING EARTH CORES

**Wesley D. Franklin, 1005 D Pleasant Oaks Road, Baltimore, Md. 21234**

**Filed Nov. 14, 1975, Ser. No. 632,083**
**Int. Cl.² E21B *9/20***
**U.S. Cl. 175—44** **10 Claims**



1. A core collecting apparatus for obtaining and retrieving samples of earth from the bottom of a previously earth-drilled hole, comprising:

a. a plurality of telescoped circular casings comprising an outer and inner casing and an intermediate casing;

b. an assembly positioned within the outer casing for supporting the intermediate and inner casings, means for restricting rotation of the assembly relative to the outer casing, and means affording limited axial movement of the assembly relative to the outer casing;

c. a plurality of earth boring bits positioned on the outer end of the intermediate casing adapted to cut a circular downward path through the earth at the bottom of the said hole when the intermediate casing is rotated leaving a center core portion extending upwardly into the inner casing;
d. a rotatable hollow shaft adapted to extend into the previously bored hole for rotating the intermediate casing and for supplying a drill fluid to the apparatus;
e. means for anchoring the outer casing to the side wall of the bored hole;
f. means for retaining the core within the inner casing as the apparatus is being withdrawn from the bored hole.

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**3,964,556**

## DOWNHOLE SIGNALING SYSTEM

**Marvin Gearhart; David W. King; Rudolph R. Mendoza; Serge A. Scherbatskoy, and James D. Young, all of Fort Worth, Tex., assignors to Gearhart-Owen Industries, Inc., Fort Worth, Tex.**

**Filed July 10, 1974, Ser. No. 487,099**
**Int. Cl.² E21B *47/02***
**U.S. Cl. 175—45** **17 Claims**

1. A method of transmitting data from the bottom of a fluid-filled drill string in a borehole drilled in the earth, which comprises:
a. closing the main path of fluid in said drill string to fluid passage at the bottom of said drill string and at the surface of the earth;
b. applying fluid pressure at the top of the closed string;
c. generating data by measurements in said borehole;
d. relieving said pressure in timed sequences in said closed string in response to said data without opening said main path of fluid;
e. monitoring said pressure at the surface of the earth.

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**3,964,557**

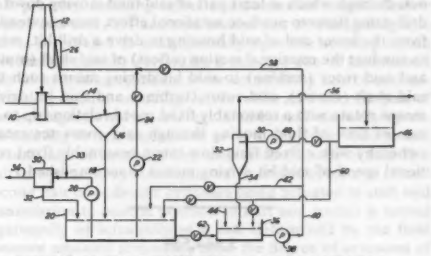
## TREATMENT OF WEIGHTED DRILLING MUD

**Hans C. Juvkam-Wold, Monroeville, Pa., assignor to Gulf Research & Development Company, Pittsburgh, Pa.**

**Filed Oct. 11, 1974, Ser. No. 513,998**
**Int. Cl.³ C09K *7/00*; E21C *7/00***
**U.S. Cl. 175—66** **6 Claims**

1. A system for the rotary drilling of wells utilizing a weighted drilling mud comprising a shale shaker, a mud pit, means for delivering drilling mud discharged from the well onto the shale shaker and means for transferring drilling mud passing through the shale shaker to the mud pit, a return line from the mud pit to the well, pumping means for delivering drilling mud from the mud pit through the return line to the well, a storage tank for storage of previously used weighted drilling mud, a cyclone separator adapted to withstand a high pressure, pumping means for delivering weighted drilling mud from the storage tank into the cyclone separator at a high velocity causing a pressure drop of at least 500 psi through the cyclone separator, and circulating means for delivering underflow from the cyclone separator to the well without passing through the mud pit.

3. In the rotary drilling of wells with a weighted drilling mud in which drilling mud discharged from the well is passed through a shale shaker to remove cuttings therefrom, delivered from the shale shaker to a mud pit and circulated by



circulating means from the mud pit to the well for circulation through the well, said shale shaker, mud pit, and circulating means comprising a circulating system, an improved method of increasing the density of drilling mud in the well comprising maintaining outside of the circulating system a supply of weighted drilling mud having a density of 12 to 14 pounds per gallon obtained from a previously drilled well, passing a stream of the 12 to 14 pounds per gallon drilling mud through a cyclone separator at a rate causing a pressure drop of at least 500 psi in the cyclone separator to separate the 12 to 14 pounds per gallon drilling mud into an underflow stream having a density of 16 to 20 pounds per gallon and an overflow stream, and delivering the underflow stream to the well without passing through the mud pit.

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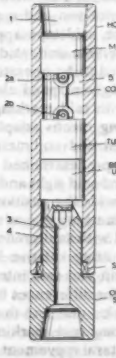
**3,964,558**

## FLUID ACTUATED DOWNHOLE DRILLING DEVICE

**Stephen Fuller Fogle, Houston, Tex., assignor to Texas Dynamatics, Inc., Dallas, Tex.**

**Filed Nov. 13, 1974, Ser. No. 523,218**
**Int. Cl.³ E21B *3/08***
**U.S. Cl. 175—107** **5 Claims**




1. A prime mover for downhole use to convert fluid power to rotational power in earth bore hole operations comprising; a housing with a top and a bottom end having means at the top

to attach to a drill string with a bore through which fluid moving down the drill string will flow, a hydro-mechanical energy converter means to transmit energy between a moving fluid stream and a rotating shaft with a reasonably consistant ratio between shaft rotation rate and rate of flow of fluid through said converter means (a positive displacement fluid motor having a rotor and a stator) situated within said housing with such fluid channels that at least part of the fluid moving through said housing will move through said converter means (motor to produce rotational speed controlling effort in both rotational directions), a fluid turbine having a rotor situated in and axially and radially supported for rotation within the bore of said housing (for rotation about the general centerline of said housing), and a stator, the turbine having fluid channels through which at least part of said fluid moving down the drill string flows to produce rotational effort, means extending from the lower end of said housing to drive a drill bit, means to conduct the rotational motion (effort) of said shaft (motor) and said rotor (turbine) to said bit driving means such that said shaft (motor), said rotor (turbine) and said bit driving means rotate with a reasonably fixed speed relationship to the rate of flow of fluid moving through said converter means. (whereby with a fixed fluid flow rate a reasonably fixed rotational speed of said bit driving means is accomplished.)

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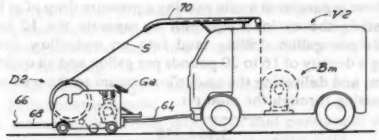
**3,964,559**

## APPARATUS FOR APPLYING TAPE MARKING MATERIAL ON ROAD SURFACES

**Ludwig Eigenmann, Vacallo, Ticino, Switzerland**

**Filed Nov. 20, 1974, Ser. No. 525,373**
**Claims priority, application Italy, Nov. 22, 1973, 31633/73**
**Int. Cl.² B60D 3/00**
**U.S. Cl. 180—1 AP** **7 Claims**



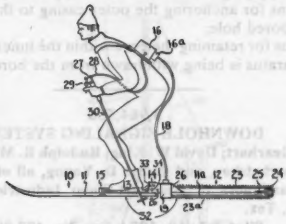

1. An apparatus for applying tape material along a predetermined path defined by a marking line as outlined by a predetermined marking trace, in combination, comprising a service unit comprising a motor-van and a subassembly including a tape applicator device, said tape applicator device being located ahead of said service unit, said service unit having first steering means adapted to be operated by a first operator for driving said unit at a given speed along a first path approximately concurrent with said marking line, said subassembly having second steering means adapted to be operated by a second operator; sight and collimating means operative for collimation with said predetermined marking trace, said second steering means and said sight and collimating means being interconnected to provide the positioning of said tape applicator device upon said marking line as said sight and collimating means are collimated with said predetermined marking trace; and means for permitting relative lateral displacement between said service unit and said interconnected subassembly so as to compensate for differences between the path actually followed by said service unit and that of said tape applicator device upon and along said marking trace, said means for permitting relative lateral movement including pushing means for pushing said tape applicator device ahead of said service unit.

**3,964,560**

## POWER DRIVEN SKI

**Royce H. Husted, Wheaton, Ill., assignor to Saroy Engineering, Wheaton, Ill.**

**Filed Feb. 20, 1975, Ser. No. 551,111**
**Int. Cl.² B62M 27/00**
**U.S. Cl. 180—5 R** **1 Claim**




1. In a power driven ski having in combination;
an anterior elongated sliding ski surface portion for slidingly contacting the snow,
a posterior one-way snow engaging endless belt portion for driving said ski,
means for connecting said anterior portion to said posterior portion,
means for attaching said ski to a skier's boot, and
motor means for powering said endless belt portion, said motor means being coupled to said endless belt portion,
the improvement wherein said one-way snow engaging belt has outwardly protruding means which automatically disengage from the snow and flatten against the belt during power-less skiing and automatically erect into and engage with snow during power skiing.

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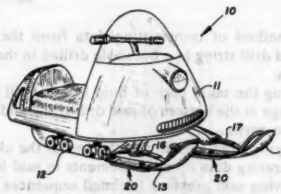
**3,964,561**

## SNOWMOBILE SKI WEAR ROD

**Leo M. Lunzer, and Allan Evgen, both of Forest Lake, Minn., assignors to Allee Manufacturing, Inc., Forest Lake, Minn.**

**Continuation of Ser. No. 241,345, April 5, 1972, abandoned. This application Sept. 11, 197[illegible] Ser. No. 504,975**
**Int. Cl.² B62M 27/02**
**U.S. Cl. 180—5 R** **3 Claims**




1. In combination with a motorized snow vehicle having frame means, drive track means for propelling said vehicle, and controllable turning ski means for guiding said vehicle and having a longitudinal ski axis and a running surface on the bottom thereof; an elongated rod secured along the bottom of said ski means and with the axis thereof extending generally parallel to the longitudinal axis of the ski, said elongated rod means comprising:
a. a rod having a closed generally circular cross-section and with a forward tip end, a rear tip end, and a shank portion extending therebetween and providing a generally convex running surface;
b. said shank portion having a generally inwardly directed radially extending groove formed therein to provide an axially arranged slot with parallely disposed laterally extending edge surfaces formed along the convex running

surface thereof and extending along the length thereof; and

c. mounting means arranged along the shank portion for securing said rod to the underside of said ski means, and means for maintaining axial alignment between said elongated rod and said ski means.

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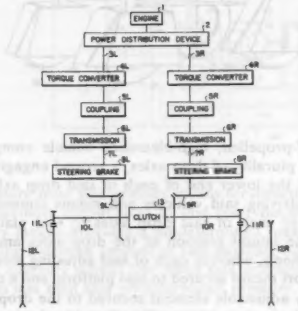
## 3,964,562
## STEERING SYSTEM FOR AN ENDLESS TRACK TYPE TRACTOR

**Eiji Kawamura; Yoshitaka Nishimura, and Hisashi Fukumoto, all of Hirakata, Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan**

**Filed June 10, 1975, Ser. No. 585,671**
**Claims priority, application Japan, June 10, 1974, 49-64916**
**Int. Cl.² B62D *11/08***
**U.S. Cl. 180—6.7** **4 Claims**




**1.** A steering system for an endless track type tractor having an engine, a power distribution device connected to said engine for equally distributing the power of said engine to two output shafts of said power distribution device, a pair of power trains each connected to the respective one of said output shafts and including a torque converter, a coupling, a transmission, a steering brake for applying braking force to the output shaft of the transmission when the same is shifted to neutral position, a bevel gear mechanism connected to the output shaft of said transmission, a lateral output shaft connected to said bevel gear mechanism so as to be driven by the power of said torque converter through said transmission when said steering brake is in the disengaged position and a final reduction gear mechanism for transferring the power from said lateral output shaft to a sprocket for driving the endless track engaging around a portion of said sprocket, the braking by said steering brake of the output shaft of either one transmission when shifted to neutral position effecting the turning of the tractor rightwardly or leftwardly, a hydraulic fluid source, an electric source, a first pair of hydraulic cylinders each connected to said hydraulic fluid source and coupled with the respective transmission for shifting the same to neutral position upon actuation of said hydraulic cylinder, a second pair of hydraulic cylinders each connected to said hydraulic fluid source and coupled with the respective steering brake for braking said output shaft of said transmission upon actuation of said hydraulic cylinder, a first pair of electromagnetic valves connected to said electric source and each connected between the hydraulic fluid source and the respective hydraulic cylinder of said first pair for actuating the same upon energization of said valve, a second pair of electromagnetic valves connected to said electric source and each connected between said hydraulic fluid source and the respective hydraulic cylinder of said second pair for actuating the same upon energization of said valve, a manually operable steering switch mechanism connected to said electric source and said first and said second pair of electromagnetic valves for selectively energizing either one of said first pair of electromagnetic valves and either one of said second pair of electromagnetic valves so as to apply braking force to the output shaft of either one of said transmissions while the same is shifted to neutral position so that said tractor is turned rightwardly or leftwardly at a rate determined by the hydraulic fluid pressure of said hydraulic fluid source supplied to said second pair of hydraulic cylinders coupled with the respective steering brakes, wherein the improvement comprises a pair of adjustable pressure reducing valves each connected between said hydraulic fluid source and the respective one of said second pair of hydraulic cylinders in parallel to the respective electromagnetic valve of said second pair and a coupled switch mechanism operably coupled with the respective one of said adjustable pressure reducing valves and connected to said electric source and said first and said second pair of electromagnetic valves in parallel to said manually operable steering switch mechanism thereby permitting a selected one of said second pair of hydraulic cylinders to be actuated by one of said adjustable pressure reducing valves while said second pair of electromagnetic valves are regulated by said manually operable steering switch mechanism so as to supply no fluid to said second pair of hydraulic cylinders with the one of said first pair of hydraulic cylinders related to said selected one of said second pair of hydraulic cylinders being actuated to shift said transmission to neutral position so that said tractor is turned rightwardly or leftwardly at a rate determined by the fluid pressure adjusted depending upon the degree of actuation of said adjustable pressure reducing valve.

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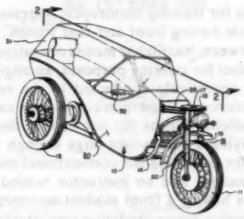
## 3,964,563
## WHEEL-SUPPORT STRUCTURE IN VEHICLES

**Carling D. Allen, 581 N. 640 West, Orem, Utah 84057**

**Filed Jan. 29, 1975, Ser. No. 545,192**
**Int. Cl.² B60G *19/02***
**U.S. Cl. 180—27** **6 Claims**



**1.** A vehicle including, in combination, a frame, an engine mounted to said frame, a first wheel, means coupled to said frame for pivotally supporting said first wheel proximate an extremity of said frame, second and third wheels having stub axles disposed in a mutual, horizontally-shifting vertical plane, said stub axles each being provided with driven power means, differential structure having transmission drive line structure coupled to said engine and a pair of axially aligned, oppositely extending axles each having drive power means coupled to said driven power means, a pair of housing arms disposed on opposite sides of said vehicle and respectively encasing said drive and driven power means, a pair of pulleys fixed to respective ones of said housing arms and being journaled with respect to said oppositely extending axles, a pair of pulley sets each having a fixed vertical axle and upper and lower idler pulleys horizontally mounted thereto, flexible elongate connector means keyed to and intercoupling said housing pulleys and having upper and lower courses traversing about said upper pulleys and said lower pulleys of said pulley sets, respectively, whereby a vertical movement of one of said second and third wheels will produce an opposite, compensating vertical movement in the remaining of said second and third wheels such that said oppositely extending axles always remain essen-

tially horizontal, and means for releasably locking said flexible elongate connector means against movement, whereby to temporarily essentially fix the relative mutual disposition of said housing arms.

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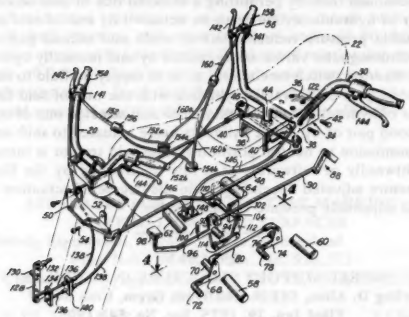
3,964,564

## SYSTEM FOR TRAINING MOTORCYCLE OPERATORS

James A. Pittarelli, Howard Beach, N.Y., assignor to Driver's Agency Ltd., Ridgewood and James A. Pittarelli, Howard Beach, both of, N.Y.

Filed Dec. 19, 1973, Ser. No. 426,201
Int. Cl.² B62D 61/02
U.S. Cl. 180—33 R 5 Claims



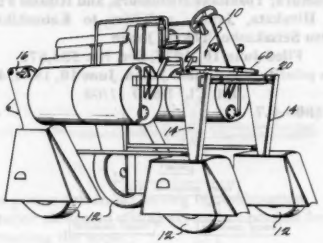
1. In a system for training motorcycle operators, a conventional motorcycle having front and rear wheels, a frame connected therebetween, handlebar means operatively connected to said front wheel for steering purposes, an engine carried by the frame and operatively connected to the rear wheel for driving the motorcycle, and control means carried by the frame and handlebar means for controlling the motorcycle, said frame carrying a seat means large enough to accommodate a student for operating the conventional motorcycle in a conventional manner and an instructor behind the student, said seat means having a front student-accommodating area and a rear instructor-accommodating area situated rearwardly of said front student-accommodating area with a predetermined space situated between said area, additional handlebar means pivotably mounted on said frame at the region of said space, and transmission means extending between said additional handlebar means and the conventional handlebar means connected to the front wheel for compelling both of the handlebar means to operate identically, and additional control means operatively connected with said frame and said additional handlebar means to be accessible for operation by the instructor to control the motorcycle, said transmission means being in the form of a parallelogram linkage, said frame including at said space a channel having an upper wall and a pair of side walls extending downwardly from opposed side edges of said upper wall and respectively formed with aligned slots, said additional handlebar means being pivotally connected to said upper wall while said parallelogram linkage includes a rear transverse bar extending through said slots and beyond said channel and having an intermediate portion connected to said additional handlebar means for turning movement therewith, a front transverse bar connected to the conventional handlebar means, and a pair of elongated side rods respectively disposed on opposite sides of said frame and each connected between and pivotally connected to the front and rear transverse bars.

3,964,565

## HIGH CLEARANCE VEHICLE WHEEL SPACING ADJUSTMENT

Wesley J. Cagle, and Ronald F. Hodge, both of Huntsville, Ala., assignors to John Blue Company Division of Subscription Television, Inc., New York, N.Y.

Filed July 18, 1974, Ser. No. 489,714
Int. Cl.² B62D 21/14, 61/00
U.S. Cl. 180—70 R 11 Claims



1. A self-propelled, high-clearance vehicle comprising a platform, a plurality of drop axles, a ground engaging wheel mounted at the lower end of each of said drop axles, drive means for driving said vehicles and means connecting the upper end of each of said drop axles to said platform for adjusting the lateral position of the drop axles and ground engaging wheels, wherein each of said adjusting means comprises support means secured to said platform and a cooperating laterally adjustable element secured to the drop axle for each of said wheels, said laterally adjustable elements having bearings secured thereto, said bearings adapted to engage said support means during lateral adjustment of said laterally adjustable elements, means for moving each of the laterally adjustable elements within said support means on said bearings relative to said platform and holding means for holding said laterally adjustable element in a fixed stationary adjusted position relative to said platform and co-acting with each of said laterally adjustable elements and said support means to disengage said bearings from their engagement with said support means after adjustment.

2. A structure as in claim 1 wherein said drive means comprises laterally extending drive shafts connected to at least the rear drop axles, said drop axles being drivingly connected to their respective wheels, wherein said shafts are slidably connected to said drive means for transmitting power to the rear ground engaging wheels in all of their laterally adjusted positions.

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3,964,566

## SYSTEM FOR PROVIDING AUXILIARY POWER

William E. Smith, Climax, and Charles J. Bowden, Galesburg, both of Mich., assignors to General Signal Corporation, Rochester, N.Y.

Division of Ser. No. 475,212, May 31, 1974, Pat. No. 3,896,618. This application July 21, 1975, Ser. No. 597,604
Int. Cl.² B62D 5/06
U.S. Cl. 180—133 31 Claims

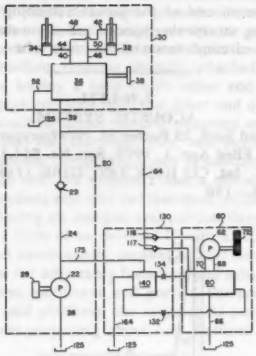
1. A system for providing auxiliary power which comprises:

a primary means including a primary pump, an output line to provide primary power to a work function means, and a return line;

an auxiliary means including an auxiliary pump, an output line to provide said auxiliary power, a return line, a valve means for controlling fluid flow in said output and return lines of said auxiliary means , and a drive means connected to a vehicle for operating said auxiliary pump whenever said vehicle is moving;

a reservoir connected to said primary return line and said auxiliary return line;

a controlled leakage means for cooling said auxiliary pump being connected to said auxiliary means, said reservoir and said primary means and being responsive to fluid



pressure from said primary means for directing a portion of auxiliary output fluid to said reservoir when the primary means provides a predetermined pressure and directing a desired amount of said auxiliary output fluid to said auxiliary output line when said primary means provides less than said predetermined pressure.

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**3,964,567**

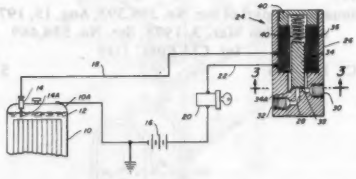
**LOW COOLANT LEVEL PROTECTION SYSTEM**

**Otto Wayne McGinty, Box 2961, Ripley, Okla. 74062**

**Filed Dec. 23, 1974, Ser. No. 535,498**

**Int. Cl.² F02B 77/08**

**U.S. Cl. 180—103 R** **1 Claim**



1. In a vehicle having a radiator, the radiator having liquid coolant therein, the vehicle having an engine operated on fluid fuel, a fuel source and a conduit connecting the fuel source to the engine, a low coolant level protection system comprising:

a. a probe extending within the upper portion of the radiator and insulated from it, the probe having conductive contact with the coolant when the coolant is at normal operating levels;

b. a battery having one pole connected to ground and to the radiator providing continuity with the coolant herein;

c. a relay having a coil, a normally open switch and a normally closed switch, the relay coil being in electrical series with said battery, said probe and to ground, whereby said coil is energized when continuity is made between said probe and coolant in said radiator;

d. a solenoid valve having:

1. a fluid passageway therethrough connected in said conduit between said fuel source and engine of the vehicle;

2. a valve seat forming a part of said fluid passageway;

3. a solenoid in electrical series with said relay normally open switch, said battery and ground;

4. a plunger acted upon by said solenoid, the plunger having a sealing face engagable with said valve seat when the valve is in the closed position, the plunger sealing face having a shallow depth groove therein permitting restricted flow of fuel through the valve when the valve is in the closed position; and

5. a spring normally retaining the valve plunger in closed position except when said solenoid is energized to withdraw said plunger against said spring in which case unrestricted flow of fuel through the valve is provided;

an indicator light in series with said relay normally closed switch said battery and ground;

whereby when said coolant level in said radiator is at a normal operating level continuity is provided through said radiator, coolant and probe to energize said relay to close said normally open switch and thereby energize said valve solenoid, moving said plunger to the opened position allowing unrestricted fuel flow to said engine and wherein low coolant level causes continuity to be lost between said coolant and said probe, de-energizing said relay to open said normally open switch thereby de-energizing said valve solenoid, said spring serving to close said plunger against said valve seat, permitting only restricted fuel flow through said shallow depth groove in said plunger to said engine, said indicator light being energized when said relay coil is de-energized to indicate the condition of low coolant level.

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**3,964,568**

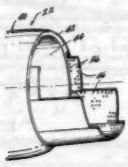
**GAS TURBINE ENGINE NOISE SHIELD**

**Gerhard Neumann, Swampscott, Mass., assignor to General Electric Company, Cincinnati, Ohio**

**Division of Ser. No. 503,750, Sept. 6, 1974. This application Feb. 14, 1975, Ser. No. 550,130**

**Int. Cl.² E04B 1/99**

**U.S. Cl. 181—33 HA** **1 Claim**



1. A turbofan engine comprising:

a core engine including, in series flow relationship, an axial flow compressor, a combustor to which pressurized air from the compressor and fuel are delivered for combustion therein to provide a hot gas stream, a first turbine downstream of said combustor adapted to be rotatably driven by said hot gas stream, and a shaft drivingly connecting said compressor rotor and said first turbine; a second turbine rotatable independently of the rotatable elements of the core engine, said second turbine disposed downstream of said first turbine and adapted to be rotatably driven by said hot gas stream; an inlet assembly for selectively reducing noise propagation, said inlet assembly comprising an inlet duct, said duct disposed about at least a portion of said core engine; and a fan assembly disposed in said duct for pressurizing air flow through said duct, said fan drivingly connected to said second turbine; said inlet assembly further comprising movable deflector means, said deflector means operatively connected to an actuating means whereby said deflector means is axially positionable at a first effective operating position within a first sector of said inlet duct, and further axially posi-

tionable at at least a second effective operating position within a second sector of said inlet duct, wherein said second sector is circumferentially disposed from said first sector.

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**3,964,569**

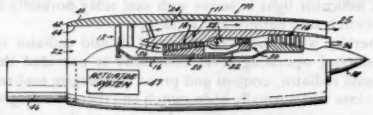
**GAS TURBINE ENGINE NOISE SHIELD**

**Gerhard Neumann, Swampscott, Mass., assignor to General Electric Company, Cincinnati, Ohio**

**Filed Sept. 6, 1974, Ser. No. 503,750**

**Int. Cl.² E04B *1/99***

**U.S. Cl. 181—33 HA** **14 Claims**



**1.** A gas turbine engine inlet assembly for selectively reducing noise propagation, said inlet assembly including: an inlet duct and movable deflector means, wherein said deflector means are operatively connected to an actuating means such that said deflector means are axially positionable at a first effective operating position within a first sector of said inlet duct, and further axially positionable in at least a second effective operating position within a second sector of said inlet duct, and said second sector is circumferentially disposed from said first sector.

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**3,964,570**

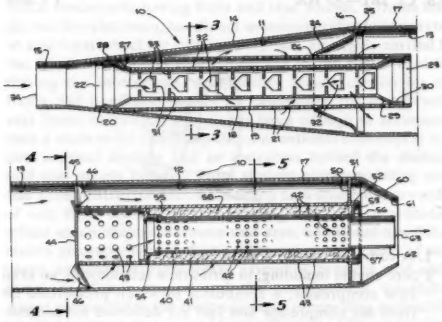
**SILENCER FOR COMBUSTION ENGINES**

**Raymond A. Morrow, 601 S. East St., Anaheim, Calif. 92805**

**Filed Aug. 22, 1975, Ser. No. 606,867**

**Int. Cl.² F01N *1/10***

**U.S. Cl. 181—56** **8 Claims**



**1.** A silencer for attachment to the exhaust pipe of relatively low horsepower combustion engines comprising an elongated jacket with a chamber therein having an upstream entrance end and a down stream exhaust outlet end, said chamber having an upstream chamber section, a downstream chamber section and an intermediate vestibule section, a pair of mutually spaced concentric tubes in the upstream chamber section, with the outer tube diametrically spaced from the jacket, both said tubes having perforations through the walls, and an imperforate annular collar extending around and in engagement with the outer tube adjacent the downstream end and in sealing angagement with the jacket, a deflecting baffle extending across the downstream end of the vestibule section, said baffle havng a circumferentially disposed series of deflector vanes with openings therebetween, the vanes being pitched obliquely relative to the longitudinal axis of the downstream section whereby to impart a spiral direction to exhaust gas passing therethrough, a pair of diametrically spaced concentric tubes in the downstream section, both said last identified tubes having perforations through the respective walls, the outer tube being spaced radially inwardly from the jacket forming a substantially cylindrical space, and a collar between the jacket and the tubes closing the cylindrical space and the space between said tubes, said collar having a central opening therein for the inner tube and an annular outflow deflector on the downstream end of the jacket extending to an annular edge forming an opening spaced radially outwardly with respect to the circumference of the inner tube.

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**3,964,571**

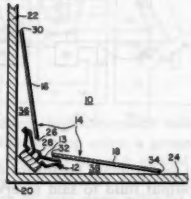
**ACOUSTIC SYSTEM**

**Peter Garland Snell, 25 Barton St., Newburyport, Mass. 01950**

**Filed Apr. 1, 1975, Ser. No. 564,153**

**Int. Cl.² H05K *5/00*; G10K *11/00***

**U.S. Cl. 181—150** **12 Claims**



**1.** An acoustic system for dispostion proximate to an acoustical boundary comprising at least one acoustic transducer, with a diaphragm, for directing acoustic energy away from the boundary and an acoustic reflector surface extending from proximate to the center of said diaphragm to said boundary without substantial acoustic discontinuity along its extent and at the junction of said boundary and surface.

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**3,964,572**

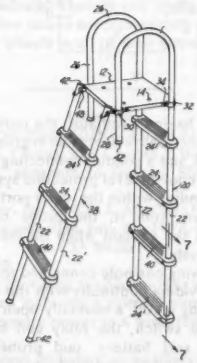
**ADJUSTABLE SAFETY LADDER FOR ABOVE-THE-GROUND SWIMMING POOLS**

**Peter F. Gannon, 8301 16½ Mile Road, Sterling Heights, Mich. 48077**

**Continuation-in-part of Ser. No. 399,393, Aug. 15, 1973. This application Mar. 3, 1975, Ser. No. 554,469**

**Int. Cl.² E06C *1/39***

**U.S. Cl. 182—86** **5 Claims**



**1.** A safety ladder for an above-the-ground swimming pool provided with a peripheral wall forming a separation between a water side and a ground side, said safety ladder comprising a platform; means for fastening said platform on the top of

said wall, with a side of said platform projecting on the water side of said pool and an opposite side projecting on the ground side; a pivotal detachable ladder section having a pair of substantially parallel spaced apart side rail members and a plurality of steps fastened intermediate said side rail members; connecting means for pivotally detachably attaching said pivotal detachable ladder section to said platform, said connecting means comprising a pair of brackets permanently attached to said platform on the ground side of said pool, aligned apertures at the end of each of said side members and at the end of each of said brackets, and a pin having a generally U-shaped resilient retainer pivotally attached to one end of said pin and having a loop on its other end adapted to springingly engage and lock onto the other end of said pin; a permanently attached ladder section mounted on said platform and disposed on said water side, said permanently attached ladder section comprising a pair of substantially parallel spaced apart side rail members and a plurality of steps fastened intermediate said side rail members, each of said side rail members having an integral end portion devoid of steps bent over in the form of an inverted U with a rectilinear end section disposed substantially parallel to said side rail members, and means for adjustably fastening said tubular side rail members and the rectilinear end portion thereof proximate the corners of said platform, the inverted U portion of said side rail members projecting above said platform.

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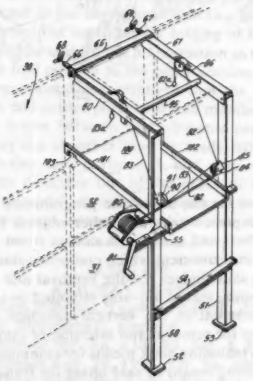
**3,964,573**

## CIRCUIT BREAKER ELEVATOR

George A. Wilson, Pineville, Pa., assignor to I-T-E Imperial Corporation, Spring House, Pa.

Filed Oct. 23, 1973, Ser. No. 408,286
Int. Cl.² E06C 7/16
U.S. Cl. 182—116 5 Claims



1. A removable circuit breaker elevator for lifting and lowering circuit breakers from each of a plurality of vertically stacked circuit breaker compartments entered to a maximum predetermined depth behind a front panel of one of a plurality of switchboards; said elevator comprising: first and second elongated vertical frame members which are parallel with one another and with the front of said switchboard; a plurality of spaced horizontal frame members secured to and extending between said spaced vertical frame members and permanently disposed at vertical positions each generally aligned with the bottoms of each of said vertically stacked circuit breaker compartments in each said switchboard; first and second end frame members pivotally connected at one of their ends to the upper end of said first and second vertical frame members respectively, each said end frame member having a length greater than said maximum predetermined depth; switchboard attachment means connected to the opposite ends of said first and second end frame members, respectively, for temporarily immovable attachment to the top of said switchboard when said end frame members are pivoted to a horizontal position; a pan member; said pan member having a generally flat bottom and a length longer than the distance between the front of said switchboard and said first and second spaced vertical frame members; said pan member being removably seatable at one end thereof on one of said plurality of spaced horizontal frame members and being removably connectable at its other end to the bottom of said given compartment in said switchboard; said bottom of said given compartment being in vertical alignment with said one of said plurality of spaced horizontal frame members; and winch means connected to said elevator and having flexible lifting cable means extending downwardly from at least one of said first and second end frame members, whereby said elevator is storable in a minimum volume away from said plurality of switchboards when said end frame members are pivoted to a vertical position and is positionable in front of a given circuit breaker compartment of given switchboard with said first and second vertical frame members spaced at least said maximum predetermined distance from and in front of said given compartment when said end frame members are temporarily immovably connected to the top of said switchboard, and said winch means raises and lowers a circuit breaker to be installed or removed, respectively, in said given compartment.

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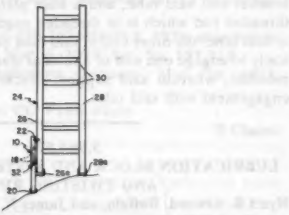
**3,964,574**

## LADDER LEVELING DEVICE

Pasquale P. Bentivegna, 56 Gladstone St., East Boston, Mass. 02128

Filed Oct. 29, 1974, Ser. No. 518,220
Int. Cl.² E06C 7/44
U.S. Cl. 182—204 7 Claims



1. A ladder leveling device for attachment to a ladder having two legs spaced laterally apart and a number of rungs spacedly extending between the legs, said device comprising, in combination;

two oppositely disposed sides,

a foot arranged at the bottom end of the sides and extending between the sides to at least partially support the sides in an upright substantially parallel position,

a plurality of connector walls coupled between the sides in spaced apart relationship and tilted at an angle to the vertical to provide slots at predetermined heights of the device,

a tongue means having a downwardly depending end secured to a side surface of one of the legs of the ladder at the lower end of the one leg,

said tongue means for fitting with one of said connector walls with the depending end fitting within one of the slots,

said sides, foot and connector walls forming a unitary structure interlocked by said tongue means adjacent the one leg,

and fastener means including two parts, one secured to said one leg above the tongue means and the other part secured to one of said sides.

3,964,575

## BUILDERS SCAFFOLDING

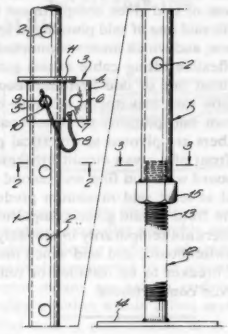
Peter Eric Gostling, Sutton Coldfield, England, assignor to C. Evans & Sons Limited, Gants Hill, Ilford, Great Britain

Filed Aug. 8, 1974, Ser. No. 495,890

Claims priority, application United Kingdom, Aug. 13, 1973, 38212/73

Int. Cl.² E04G 5/02

U.S. Cl. 182—230 5 Claims



1. A base jack for the standards of a scaffold structure, which comprises a tube having a plurality of spaced transverse holes, a support bracket slidable lengthwise of said tube and having a transverse hole arranged to coincide with any one of said holes in said tube, said support bracket comprising a metal strip which is shaped to present a box-like projection, the free ends of said strip being of arcuate formation to closely fit around said tube and to be fixed to said tube, a locking pin provided to extend through said coincident holes in said bracket and said tube, and a base plate supporting a screw-threaded rod which is in threaded engagement with one end of said tube, the other end of said tube being adapted telescopically to engage one end of a tubular standard or other tubular member, wherein said support bracket is in direct sliding engagement with said tube.

3,964,576

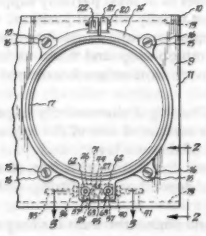
## LUBRICATION BLOCK AND SYSTEM FOR SPINNING AND TWISTING RINGS

Hyatt B. Atwood, Buffalo, and James N. McLean, Tonawanda, both of N.Y., assignors to Herr Manufacturing Company, Inc., Tonawanda, N.Y.

Filed Sept. 9, 1974, Ser. No. 504,343

Int. Cl.² D01H 7/62

U.S. Cl. 184—7 A 22 Claims



1. A spinning ring system comprising a rail, a plurality of holders, means mounting said holders on said rail, a spinning ring mounted on each of said holders, individual lubricant block means for each of said holders including lubricant feeder means in each of said lubricant block means for metering lubricant to a respective spinning ring, first conduit means in each of said individual lubricant block means for conducting lubricant into said lubricant block means and to said lubricant feeder means, securing means for securing each of said individual lubricant block means directly to a respective holder in lubricant-conducting relationship, second conduit means in each of said holders for conducting lubricant from each of said lubricant feeder means therein to a respective spinning ring, and third conduit means for conducting lubricant to said first conduit means from a lubricant source.

3,964,577

## AUTOMATED HANDLING SYSTEM FOR BANK DEPOSIT BOXES

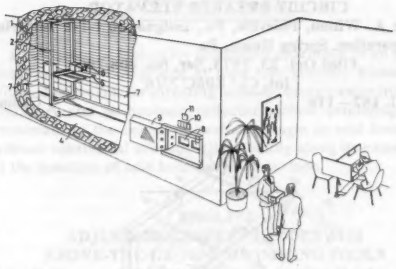
Sture B. Bengtsson, Goteborg, Sweden, assignor to Robur Konsult AB, Goteborg, Sweden

Filed Aug. 12, 1974, Ser. No. 496,835

Claims priority, application Sweden, Aug. 22, 1973, 7311405

Int. Cl.² B65G 1/06

U.S. Cl. 186—1 R 21 Claims



1. In a system for the automatic programmed handling of coded safety deposit boxes and other objects having book receiving members and stored in a storage room having rows of shelves, the improvement which comprises stacking means movable along said shelves for the removal and insertion of said boxes, gripping means movably mounted on said stacking means for movement in the vertical direction and on the horizontal plane for removal and insertion of said boxes, said gripping means including hook means for communication with said hook receiving means of said boxes for transporting said boxes, programming means cooperating with said stacking means and said gripping means for automatically directing said stacking means and said gripping means to a desired box by way of a predetermined program, said programming means including control means for keying-in the desired box and initiating box hand-out and hand-in positions, transport means for transporting a handed-in deposit box to a temporary storage magazine for subsequently returning said box by means of stacking means to a storage position, and at least one issuing and receiving opening disposed adjoiningly in the wall of said storage room for receiving and returning said boxes, whereby upon receipt of instructions by the programming means of the desired box, the stacking means is actuated and moves automatically along the shelves to the proper position, the gripping means at the proper location engages or disengages the hook means and the hook receiving means in the box hand-out and hand-in positions and delivers or retrieves the box at the issuing and receiving openings.

3,964,578

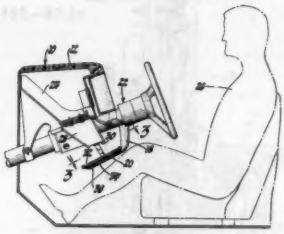
## ENERGY ABSORBER

Lewis B. Campbell, Centerville; Robert E. Huffman, Tipp City, and Robert L. Jones, Bellbrook, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 27, 1975, Ser. No. 608,155

Int. Cl.² F16F 7/12; B60R 21/04

U.S. Cl. 188—1 C 3 Claims



1. An energy absorber adapted to be interposed between a rigid support element and an impact receiving element movable relative to the support element under impact loads comprising, in combination, a member of plastically deformable material including a continuous integral outer portion for securement to one of said elements, said member also including a like shaped continuous inner portion within the outer portion, the inner portion being integrally connected at two spaced locations to the outer portion to divide the inner portion into two separate units foldable relative to each other and to the outer portion, said member further including a like shaped center portion within the inner portion for securement to the other of said elements, the center portion being integrally connected to the inner portion of two spaced locations intermediate the first locations for folding of the center portion relative to the units of the inner portion as the units of the inner portion fold relative to the outer portion, said absorber being so proportioned and arranged that the outer portion, inner portion and center portion of said member in plan view along a line drawn between said elements nest within each other whereby the absorber may be made from a flat sheet pierced to define said portions in said plan view and then formed in one direction out of the plane of the sheet in a generally trapezoidal elevational configuration capable of collapsing when said elements move towards each other.

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3,964,579

## RAILWAY BRAKES

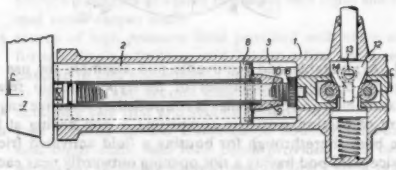
Anthony William Harrison, Tyseley, England, assignor to Girling Limited, Birmingham, England

Continuation of Ser. No. 430,692, Jan. 4, 1974. This application Aug. 29, 1975, Ser. No. 609,106

Claims priority, application United Kingdom, Jan. 5, 1973, 852/73

Int. Cl.² F16D 65/56

U.S. Cl. 188—71.9 13 Claims



1. A brake comprising a rotor having a friction surface thereon, means for braking said rotor by applying a braking torque to said friction surface comprising an elongated body of friction material moveable into engagement with the friction surface to apply the brake and which prior to use has a length in its direction of movement substantially greater than its dimension transverse to its direction of movement, said body being disposed wholly on one side of said friction surface and having and second opposed ends, a support for said body of friction material also disposed wholly to said one side of said rotor friction surface and aligned therewith, said support terminating in a torque sustaining end part facing the friction surface of the rotor in close spaced adjacency thereto and laterally supporting said body of friction material adjacent its first end to sustain braking torque exerted thereon when it is moved into engagement with the frictional surface of the rotor, and means for moving said body towards and away from said friction surface to apply and release the brake comprising an axially movable adjusting member extending at least partially alongside said body of friction material to said one side of said rotor friction surface, an element having an axially adjustable connection with said adjusting member and extending rigidly laterally from said connection into operative engagement with the second opposed end of said friction material, means exclusively to said one side of said rotor friction surface for selectively exerting an axial force on said adjusting member in the direction of said rotor friction surface, said element transmitting said force from said adjusting member to said body of friction material for moving its first end into braking engagement with said rotor friction surface in response to the axial force exerted on said adjusting member, and means for operating said adjusting member to move said axially adjustable connection and said element relative to said adjusting member in the direction of said rotor surface to adjust the position of the body of friction material relative to said support.

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3,964,580

## BRAKE SHOE FOR SPOT-TYPE DISC BRAKES

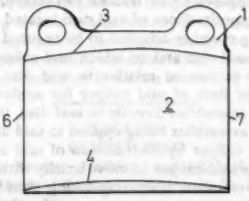
Heinz Gunter Hahm, Frankfurt am Main, and Nedo Igor Pocci, Neuenhain, both of Germany, assignors to ITT Industries, Inc., New York, N.Y.

Continuation of Ser. No. 448,767, March 6, 1974, abandoned. This application Mar. 6, 1975, Ser. No. 555,914

Claims priority, application Germany, Mar. 24, 1973, 2314823

Int. Cl.² F16D 69/04

U.S. Cl. 188—73.1 5 Claims



1. A brake shoe for spot-type disc brakes, said disc brakes having a brake disc rotating about an axis, said brake disc including an arcuate friction surface having a radially inner and outer edge with respect to said axis, comprising:

a one piece steel backing plate having two lateral faces;

a recess disposed in said backing plate, said recess having radially inner and outer walls with respect to said axis extending toward said disc and between said two lateral faces of said backing plate, each of said inner and outer walls having a different predetermined configuration; and

a friction pad wholly embedded in and fastened to said recess, said pad extending to at least said two lateral faces of said backing plate, said friction pad having radially inner and outer walls with respect to said axis extending toward said disc which contact and conform to said dif-

ferent predetermined configurations of said inner and outer walls of said recess to receive directly from said pad all brake torque exerted on said pad by said disc, said pad being fastened at at least one point to the bottom of said recess by retaining means to retain said pad in said recess without brake torque being exerted on said retaining means;

said configuration of said inner wall of said recess being a first curvature in a first direction; and

said configuration of said outer wall of said recess being a second curvature in the same direction as said first direction;

each of said first and second curvatures having a radius of curvature less than infinity.

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**3,964,581**

## DISC BRAKE ASSEMBLY HAVING A RELEASABLE DRAG-TAKING MEMBER

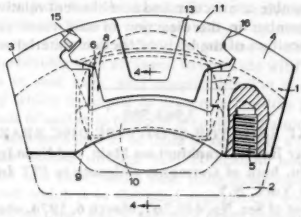
**Gordon Alfred Habgood, Shipston-on-Stour, England, assignor to Girling Limited, Birmingham, England**

**Filed Apr. 24, 1974, Ser. No. 463,613**

**Claims priority, application United Kingdom, Apr. 24, 1973, 19459/73**

**Int. Cl.² F16D *65/20***

**U.S. Cl. 188—73.3** **3 Claims**



**1.** A disc brake for a vehicle comprising a rotatable disc, a caliper straddling a portion of the peripheral edge of said disc, and having opposed limbs, friction pad assemblies for engagement with opposite faces of said disc located in said caliper, a drag-taking member adapted to be secured to a fixed part adjacent to said disc and on which said caliper is guided for axial sliding movement relative to said disc, and actuating means in one limb of said caliper for applying one of said friction pad assemblies directly to said disc, the other of said friction pad assemblies being applied to said disc by the other limb of said caliper by the reaction of said actuating means which causes said caliper to move axially with respect to said drag-taking member, said drag-taking member having opposed axial ends and comprising a pair of separate spaced arms forming first drag-taking means for said directly actuated friction pad assembly and second separate guide means for said caliper, said arms having separate, free, circumferentially spaced radially innermost ends, each of the innermost ends of said arms having an opening whose axis is substantially parallel with a radius of the disc passing through the circumferential midpoint of said drag-taking member, fastening means cooperating with each of said openings for releasably connecting said drag-taking member to said fixed part in a direction substantially perpendicular to a line of action of the drag forces taken by the respective arms in the application of the brake, and a bar disposed at one of said axial ends of said member and separate from said opening and fastening means integrally interconnecting said spaced arms to maintain them in a circumferentially spaced relationship, said bar forming the sole integral connections between the arms.

**3,964,582**

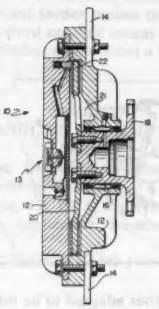
## FAN DRIVE HYDRAULIC COUPLING

**Roland J. Mitchell, Indianapolis, Ind., assignor to Wallace-Murray Corporation, New York, N.Y.**

**Filed July 26, 1974, Ser. No. 492,260**

**Int. Cl.² F16D *31/00*; B44D *1/34***

**U.S. Cl. 192—58 B** **6 Claims**



**1.** A shear type hydraulic coupling adapted for use in the cooling system of an internal combustion engine, a housing having a cavity therein containing a shear fluid, a drive disc adapted to be rotated by an engine, said drive disc positioned within said cavity to transmit torque from the disc through the shear fluid to the housing, the housing adapted to carry a fan, a portion of the sides of said drive disc being contiguous to at least a portion of the interior surfaces of said housing cavity, the improvement comprising, a polyarylene sulfide material coating on at least a portion of the sides of said drive disc.

**4.** The coupling of claim **1** wherein said material is polyphenylene sulfide.

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**3,964,583**

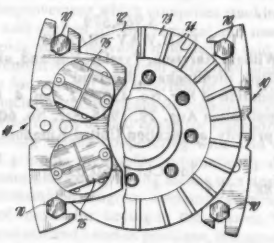
## MOUNTING OF CYLINDERS IN FRICTION BRAKES AND CLUTCHES

**Edwin J. Montalvo, Jr., 283 Anderson St., Hackensack, N.J. 07601**

**Filed Jan. 15, 1975, Ser. No. 541,126**

**Int. Cl.² F16D *25/00***

**U.S. Cl. 192—85 AA** **9 Claims**



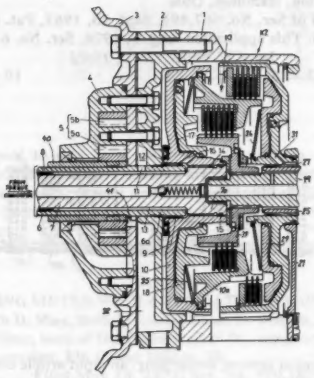
**1.** A pivotable and removable pod assembly for use in a friction coupling mechanism of the type wherein relative rotation between two bodies is controlled by selective engagement of friction members comprising, a pod having at least one bore therethrough for housing a fluid activated friction device, said pod having a slot opening outwardly near each of the ends of the pod, the slots being substantially perpendicular to each other whereby one end of the pod can be pivoted about a mounting pin in one of said slots while the other of said slots continues to surround a pin in said other slot.

3,964,584

## SPEED-CHANGING SYSTEM WITH TWO FLUID-ACTUATED CLUTCHES

Manfred Bucksch, Friedrichshafen, Germany, assignor to Zahnradfabrik Friedrichshafen AG, Friedrichsh· ·en, Germany

Filed Dec. 23, 1974, Ser. No. 535,702
Claims priority, application Germany, Dec. 24, 1973, 2364541
Int. Cl.² F16D 25/10
U.S. Cl. 192—87.11 6 Claims



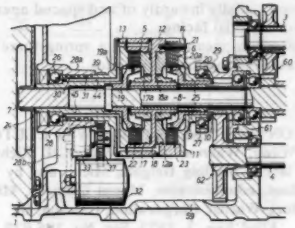
1. A speed-changing system comprising:
an engine-driven input shaft;
an inner output shaft and a surrounding outer output shaft coaxial with said input shaft;
planetary-gear means connecting said output shafts to a load;
a transmission housing surrounding parts of said input and output shafts;
a first clutch in said transmission housing including a first clutch housing positively connected with an extremity of said input shaft, first coacting annular friction elements in said clutch housing and on an extremity of said inner output shaft, and a first piston in said first clutch housing actuatable for making said first friction elements effective to couple said input shaft with said inner output shaft;
a second clutch in said transmission housing including a second clutch housing positively connected with an extremity of said outer output shaft, second coacting annular friction elements on said first clutch housing and in said second clutch housing, and a second piston in said second clutch housing actuatable for making said second friction elements effective to couple said input shaft with said outer output shaft;
a source of high-pressure fluid provided with valve means for selectively admitting said fluid to a first and a second passage in said transmission housing respectively leading to said first and second clutch housings for selectively actuating said first and second pistons; and
a tube secured to said transmission housing surrounding said input shaft, said tube being provided with bearing means for rotatably supporting said first clutch housing thereon, said tube defining with said input shaft an annular clearance forming part of said first passage, said first clutch housing being provided with a bore communicating with said clearance.

3,964,585

## HYDRAULIC DOUBLE CLUTCH OF THE WET TYPE WITH PRESSURE CONTROL VALVES

Yoshinobu Murayama, and Yashunori Uchibori, both of Sakai, Japan, assignors to Kubota Tekko Kabushiki Kaisha, Osaka, Japan

Filed Mar. 13, 1975, Ser. No. 557,964
Int. Cl.² F16D 25/10
U.S. Cl. 192—87.13 5 Claims



1. A hydraulic double clutch of the wet type comprising a drive shaft, a driven shaft coaxial with the drive shaft and having a double shaft construction, a clutch casing fixedly mounted on the drive shaft and rotatably mounted on the driven shaft, the clutch casing accommodating a wheel-driving clutch unit and a power takeoff clutch unit independent of the clutch unit, hydraulic pumps for forcing working oil into the clutch units to engage the clutch units individually independently, oil passages for forcing the working oil form the hydraulic pumps into the corresponding clutch units individually independently, control valve means independent of each other and provided for the oil passages each at an intermediate portion of the passage, the control valve means being openable and closable to control the pressure of the working oil, and a clutch housing accommodating the aforesaid members and means and serviceable also as a tank for the working oil, the clutch casing being rotatably supported by bearing cases at its front and rear portions respectively with bearings interposed between the casing and the bearing cases, the clutch casing having a gear in meshing engagement with the hydraulic pumps to drive the pumps, the hydraulic pumps being arranged at the opposite sides of the gear respectively, the oil passages being formed independently of each other in one of the bearing cases and in the clutch casing, the control valve means being automatically openable when the oil pressure on the clutch units builds up to excess to control the pressure.

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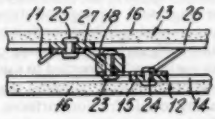
3,964,586

## CLUTCH DISC

Ronald Derek Barrett, Hockley, and Michael Roi Howard, Brentwood, both of England, assignors to Ford Motor Company, Dearborn, Mich.

Filed July 2, 1973, Ser. No. 375,551
Int. Cl.² F16D 13/60, 69/00
U.S. Cl. 192—107 C 9 Claims




1. A clutch disc constructed to be used in a vehicle clutch assembly,
said clutch disc comprising a pair of annular friction members,

said members each comprising an annular backing plate and a friction material facing affixed to said backing plate,

a carrier constructed to be connected to a rotatable shaft,

leaf spring means interposed between said backing plates,

fastener means connecting said backing plates and said carrier to said leaf spring means,

said fastener means including first rivet means securing one of said backing plates to said leaf spring means and second rivet means securing said carrier to said leaf spring means,

said first rivet means and said second rivet means being disposed radially inwardly of and spaced apart from said friction material facing,

said leaf spring means exerting a spring force urging the separation of said backing plates.

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**3,964,587**

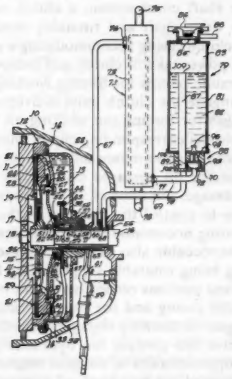
**CONTROL VALVE FOR A WET CLUTCH**

**Ting M. Wang, Warren, Mich.; Walter H. Richardson, deceased, late of Sterling Heights, Mich., and by Gregory R. Richardson, administrator, Mount Clemens, Mich., assignors to Borg-Warner Corporation, Chicago, Ill.**

**Filed Aug. 2, 1973, Ser. No. 385,029**

**Int. Cl.² F16D *13/72***

**U.S. Cl. 192—113 B** **22 Claims**



**1.** In a liquid cooled friction clutch system including a rotatable driving member connected to a prime mover, a driven member adapted to be connected to an output shaft, friction surfaces carried by said driven member, a cover plate assembly connected to said driving member, a housing enclosing said driving and driven members, pressure applying means drivingly associated with said cover plate assembly and adapted to place said driven member into engagement with said driving member, resilient means associated with said pressure applying means adapted to normally urge said driving and driven members into engagement, a non-rotatable support member carried by said housing, non-rotatable releasing means coaxial with said output shaft and axially slidable on said non-rotatable support member, said releasing means adapted to disengage said driving and driven members, and pumping means comprising a fluid conduit having an inlet end in communication with an inner periphery of said cover plate assembly and an outlet end connected to said releasing means, a first fluid conduit from said pumping means and a second fluid circuit leading to said friction surfaces, the improvement comprising a fluid reservoir interposed between said first and second fluid circuits and receiving cooling fluid from said pumping means and first fluid circuit, valve means communicating with said reservoir, a standpipe extending upwards into said reservoir and terminating short of the upper end thereof to define the static fluid level in said reservoir, said valve means including an inlet chamber communicating with said first fluid circuit and said standpipe, an outlet chamber communicating with said reservoir and said second fluid circuit, and a by-pass orifice which connects the lower end of the standpipe to said outlet chamber to allow priming of said pumping means by return of excess fluid from the reservoir through the standpipe.

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**3,964,588**

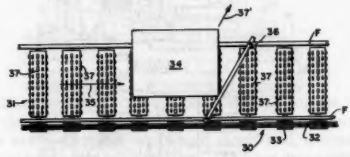
**CONVEYOR HAVING PROVISION FOR DISCHARGING LOADS AT AN ANGLE GENERALLY TRANSVERSE TO THE LINE OF TRAVEL OR THE CONVEYOR**

**Andrew T. Kornylak, Hamilton, Ohio, assignor to Kornylak Corporation, Hamilton, Ohio**

**Division of Ser. No. 667,492, Sept. 13, 1967, Pat. No. 3,550,756. This application Aug. 6, 1970, Ser. No. 61,789**

**Int. Cl.² B65G *13/10, 39/02***

**U.S. Cl. 193—36** **10 Claims**



**1.** A conveyor system, comprising: an input article conveyor having an article conveying direction; an article transfer support adjacent and aligned in the conveying direction with said first article conveyor; diverter abutment means for engaging articles being moved onto said article transfer support by said first article conveyor and providing a component of force to said articles transverse to said article conveying direction; said diverter abutment means providing a stationary article surface generally lying within a vertical plane intersecting the conveying direction of said first article conveyor means at an acute angle; said article tranfer support having a plurality of first rollers mounted transversely of the conveying direction for rotation about axes generally parallel with each other; a plurality of second rollers mounted on each of said first rollers for rotation about axes transverse to the axes of said first rollers; and said second rollers being mounted around the periphery of said first rollers so that the upper-most ones of said second rollers have upper-most surfaces lying within a common article support plane spaced above the upper-most surface of said first rollers and being generally coplanar with the article supporting surface of said first article conveyor.

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**3,964,589**

**VENDING MACHINE COIN CHANGER**

**Roderick R. Temple, 2220 Jessie Ave., Sparks, Nev. 89431**

**Filed Apr. 17, 1973, Ser. No. 352,085**

**Int. Cl.² G07F *11/02***

**U.S. Cl. 194—10** **6 Claims**

**1.** A vending machine having a pay circuit for discharging coins and a coin changer therefor comprising:

a vending machine comprising:

a first coin acceptance slot for accepting only a coin of a predetermined first denomination,

a vending machine hopper,

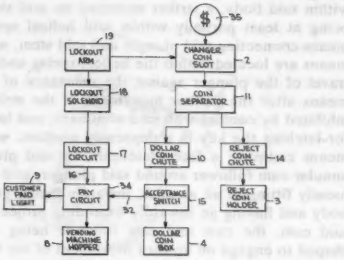
a pay circuit for simultaneously discharging a plurality of coins of said predetermined first demonination into said vending machine hopper, a coin changer connected to said vending machine comprising:

a second coin acceptance slot for accepting a coin to be changed of a second predetermined denomination,

a coin reservoir,

means for conveying said coin to be changed from said second coin acceptance slot to said coin reservoir,

means for detecting the passage of said coin to be changed through said conveying means and for transmitting a pay signal to said pay circuit of said vending machine to discharge into said vending machine hopper coins of said first predetermined denomination in return for said coin to be changed of said second predetermined denomination.

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**3,964,590**

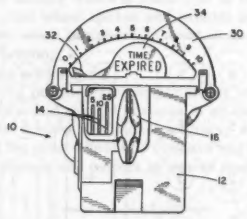
**PARKING METER WITH AUTOMATIC READING MEANS**

**Kenneth D. May, Buffalo Grove; Elmer E. Dodson, and Claude C. Cohee, both of Des Plaines, all of Ill., assignors to Qonaar Corporation, Elk Grove Village, Ill.**

**Filed May 16, 1975, Ser. No. 578,153**

**Int. Cl.² G07F 5/00**

**U.S. Cl. 194—83** **13 Claims**




**1. In a coin controlled meter construction including coin receiving means, manually controlled drive means for said receiving means, a movable cam adapted to be drivingly engaged by said receiving means, indicator means for displaying the time purchased, and a cam follower associated with said indicator means, said cam defining a surface for engagement with said cam follower, movement of said cam by said receiving means selectively positioning the cam depending upon the amount of time purchased, the improvement comprising a link having one end operatively connected to said manually controlled drive means and the other end connected to said indicator means, first means normally urging said manually controlled drive means in one direction whereby said link pulls the cam follower of said indicator means out of engagement with said surface to thereby prevent accurate reading of the time remaining on said meter, second means normally urging the cam follower of said indicator means into engagement with said cam surface, said first means applying a greater force than said second means, and wherein operation of said manually controlled drive means overcomes said first means whereby said indicator means is temporarily moved by said second means to a position for accurately reading the time remaining on the meter.**

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**3,964,591**

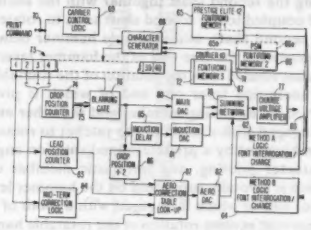
**FONT SELECTION SYSTEM**

**James David Hill; Gene Austin Isbell, and Thomas Hampton Williams, all of Lexington, Ky., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed June 10, 1975, Ser. No. 585,555**

**Int. Cl.² B41J 5/30; G01D 15/10; G06K 9/00**

**U.S. Cl. 197—1 R** **32 Claims**




**1. A printing system comprising:**

**means to print a multiplicity of type fonts;**

**individual font storage means for determining printing characteristics of each of said fonts;**

**a plurality of receptacle means in said printing system for insertion and interconnection of said individual font storage means to said system, said receptacle means accommodating any of said font storage means on a randomly insertable basis; and**

**interrogation means for determining the font storage means inserted in a specific receptacle means.**

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**3,964,592**

**PRINTING MECHANISM FOR PRINTING CHARACTERS**

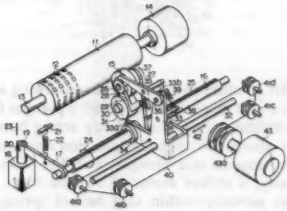
**Toshio Kashio, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 452,972, March 20, 1974, abandoned. This application Oct. 20, 1975, Ser. No. 623,562**

**Claims priority, application Japan, Mar. 24, 1973, 48-33722; Oct. 18, 1973, 48-117295**

**Int. Cl.³ B41J 1/32, 27/00**

**U.S. Cl. 197—49** **2 Claims**



**1. A printing mechanism for printing characters responsive to a printing signal, comprising:**

**a cylindrical character pattern bearing body having a plurality of character patterns embossed in a predetermined array on its surface and adapted to be rotated so that a character pattern to be printed is located in a printing position;**

**a rotatable hammer driven so as to confront the character pattern to be printed through a recording paper and urged to strike the character pattern through the recording paper to print the character on the recording paper in a colored printing material supplied to the peripheral surface of the hammer;**

a driving mechanism for driving the rotatable hammer which comprises a fixed first shaft parallel to the cylinder axis of said cylindrical pattern bearing body, a slide member slideably mounted to the first shaft and slideable along the first shaft, a rotatable second shaft parallel to the cylinder axis of said cylindrical pattern bearing body and which is rotated responsive to a printing signal and which supports the slide member to allow the slide member to move along the second shaft, a hammer lever coupled to the sliding member and slideably movable along the second shaft together with the sliding member and coupled to the second shaft so as to rotate along with the second shaft, said rotatable hammer being rotatably supported at the free end of the hammer lever, a toothed ratchet rotated with the rotation of the rotatable hammer, an anchoring lever one end of which is pivotally supported at the sliding member and the other end of which is engaged with a tooth of the ratchet to rotate the rotatable hammer by a predetermined rotation angle for each character printing, and an elastic member one end of which is pivotally supported on the hammer lever and the other end of which is engaged with a tooth of the ratchet to prevent reverse rotation of the rotatable hammer; and

a mechanism adapted to be contacted with the peripheral surface of the rotatable hammer so as to supply the colored printing material to the peripheral surface of the rotatable hammer.

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**3,964,593**

## KEYBOARDS

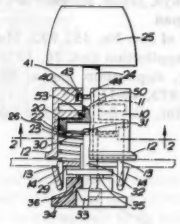
**Peter Pointon, West Molesey, England, assignor to Alphameric Keyboards Limited, West Molesey, England**

**Filed Apr. 8, 1974, Ser. No. 459,233**

**Claims priority, application United Kingdom, Apr. 9, 1973, 16940/73**

**Int. Cl.² B41J 5/08, 5/18, 5/26**

**U.S. Cl. 197—98** **13 Claims**



12. A key for an electronic keyboard comprising a body, an abutment fixed with respect to said body, a plunger slidable in said body, a helical spring in said body acting between said body and said plunger to oppose depression movement of the plunger, a key top on said plunger, a striker stem movable within the body, a striker mounted on said stem, the stem being at least partially within said helical spring, resilient means connecting said plunger and said stem which resilient means are located within the helical spring and permit overtravel of the plunger against the resistance of said resilient means after the further movement of the striker has been inhibited by contact with said abutment, and a snap-action device engaging between said plunger and said body to resist relative movement therebetween until a predetermined extent of movement has occurred, said snapaction device then operating to decrease resistance to movement, which snap-action device comprises an annular groove in the plunger above the top of the spring, and a member having at least one resilient radial arm, said member being retained in said body and extending around the plunger with the arm engaging in said groove so that, on depression of the plunger, the arm will deflect as the groove is moved downwardly but will eventually move out of the groove thereby decreasing resistance to plunger movement.

13. A key for an electronic keyboard comprising a body, an abutment fixed with respect to said body, a plunger slidable in said body, a helical spring in said body acting between said body and said plunger to oppose depression movement of the plunger, a key top on said plunger, a striker stem movable within said body, a striker mounted on said stem, the stem being at least partially within said helical spring, resilient means connecting said plunger and said stem, which resilient means are located within the helical spring and permit overtravel of the plunger against the resistance of said resilient means after the further movement of the striker has been inhibited by contact with said abutment, and latching means for latching the key in a depressed position, which latching means comprise a face plate cam on said plunger and an annular cam follower around said plunger, said cam follower loosely fitting in an annular, inwardly facing groove on said body and having an inwardly extending projection engaging said cam, the cam and cam follower being cooperatively shaped to engage on upward movement of the key with relative rotational displacement and to limit upward travel on alternate key operations whereby the key is latched down on one depression stroke and the next depression stroke releases the key.

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**3,964,594**

## KEYBOARD OF ELASTIC MATERIAL FOR OFFICE MACHINES

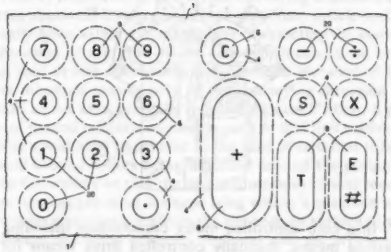
**Luigi Gabbrielli, and Piero Giovanetti, both of Ivrea (Turin), Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy**

**Filed Nov. 16, 1973, Ser. No. 416,599**

**Claims priority, application Italy, Dec. 1, 1972, 70784/72**

**Int. Cl.² B41J 5/08, 5/12**

**U.S. Cl. 197—98** **5 Claims**




1. An office machine keyboard comprising:

a continuous layer of elastic material,

a plurality of key areas defined in said layer,

a fingering surface on each one of said areas,

a plurality of inserts, one of said inserts being located in each of said areas and being formed of a material differing in elasticity from said elastic material of said continuous layer, whereby said layer flexibly holds said inserts, said inserts being depressible to function as keys for the keyboard of said office machine,

a relief on each one of said inserts to represent an identifying character for each of said keys,

and at least a passage internal to each one of said inserts and extending entirely through said insert below said relief,

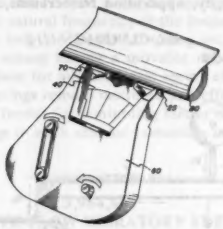
each one of said inserts being embedded in the associated key defining area of said layer, said elastic material including mechanical interlocking means comprising struts filling said passages to interlock said inserts into the elastic layer.

3,964,595

## RIBBON GUIDE FOR A SERIAL PRINTER

Andrew H. Edstrom, Oahu, Hawaii, assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 23, 1975, Ser. No. 543,560
Int. Cl.² B41J *31/12, 35/04*
U.S. Cl. 197—170 9 Claims



1. In a serial printer having a platen, a laterally movable carrier for traversing a printing line, a print wheel supported on said carrier and including a plurality of spokes extending radially outwardly and terminating in a character slug for impacting with said platen at a print position to print characters, ribbon supply means and a ribbon feed means for feeding an ink ribbon past said print wheel including ribbon exit and entrance areas having ribbon guides thereat and said print position; an improved ribbon guide member comprising:

a first concave portion,

a second concave portion laterally spaced from said first portion by a convex portion;

said first and concave second portions being positioned on opposite sides of the print position between the ribbon supply guides in a juxtaposed relation with the character slugs, said first and second concave portions defining a concave surface which is transverse to the plane formed by the print wheel spokes and extends over a portion of the print wheel periphery to assist in guiding the ribbon during printing,

a mounting portion, and

a connecting portion extending from the mounting portion to the first and second portions in an outwardly sloping direction toward the outer periphery of the character slugs of the print wheel said concave and convex portions being concave and convex as viewed from said mounting portion.

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3,964,596

## CONVEYOR, ESPECIALLY AUTOWALKS FOR PERSONS

Helmut Heusler, Dortmund-Kirchhorde; Emil Braun, Castrop-Rauxel, and Peter Hofling, Dortmund, all of Germany, assignors to O & K Orenstein & Koppel Aktiengesellschaft, Berlin, Germany

Filed Jan. 24, 1975, Ser. No. 543,827
Claims priority, application Germany, Jan. 25, 1974, 2403529
Int. Cl.² B61B *13/14*
U.S. Cl. 198—16 MS 10 Claims

1. A conveyor, especially roller foot path, for conveying persons, which includes: a first endless link chain movable in one and the same plane and with one section of said link chain movable in one direction and the other section of said link chain simultaneously movable in the opposite direction, a second endless link chain movable in one and the same plane and with one section of said link chain movable in a first direction and the other section of said link chain simultaneously movable in the opposite direction to said first direction, driving means drivingly connected to said first and second link chains for driving the same in the same direction and in synchronism with each other, and a plurality of pallet carriages having opposite end portions respectively connected to said first and second link chains, said first link chain forming the inner chain while said second link chain forms the outer chain, and ball joints and hinge joints being interposed between said first chain and the respective adjacent end portions of said pallet carriages, said last mentioned end portions of said pallet carriages being connected to said first chain by said ball joints and said hinge joints.

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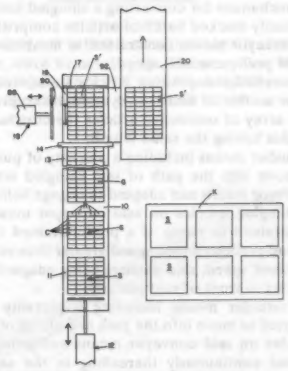
3,964,597

## METHOD AND APPARATUS FOR ARRANGING BRICKS INTO PROPER ROW SIZE FOR STACKING AND PACKAGING

John J. Brown; William F. Milholen, both of Pine Forest Drive, Siler City, N.C. 27344, and Cletue E. Lineberry, Rte. 1, Box 106, Staley, N.C. 27355

Filed July 29, 1974, Ser. No. 492,516
Int. Cl.² B65G *47/74*
U.S. Cl. 198—21 11 Claims



1. Apparatus for altering the row sizes of brick courses removed from a kiln car in preparation for stacking and strapping comprising:

a. table means having a receiving end and a discharge end;

b. means for accumulating and moving courses of bricks removed from said kiln cars and deposited on said receiving end toward the discharge end, said courses comprising a plurality of rows and columns with a known number of bricks therein;

c. carriage means slidably attached to the discharge end of said table means for reciprocation longitudinally thereof between a first, retracted position beneath said discharge

end and a second, partially extended position beyond said discharge end responsive to the movement of said means for moving bricks deposited on said receiving end toward the discharge end;

d. a pushing means connected to said carriage means for moving said carriage means to a third, fully extended position responsive to the completion of the movement of said carriage to said second position; and

e. push-off means positioned adjacent said carriage means when in said third, fully extended position for moving the bricks collected on said carriage means transversely thereof.

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**3,964,598**

## STACKING MECHANISM AND METHOD

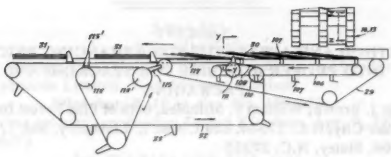
**Arthur Graham Alsop, Bristol, England, assignor to Strachan & Henshaw Limited, Speedwell, England**

**Filed July 17, 1974, Ser. No. 489,442**

**Claims priority, application United Kingdom, Apr. 19, 1974, 17356/74**

**Int. Cl.² B65G 57/00**

**U.S. Cl. 198—35** **10 Claims**



1. A mechanism for converting a shingled batch of articles to a vertically stacked batch of articles comprising:

a. A conveyor means constrained to move continuously at a first predetermined speed;

b. A means for depositing articles successively on a conveyor section of said conveyor means to produce a shingled array of successive articles thereon, said successive articles having the same length;

c. A pusher means including a plurality of pushers adapted to move into the path of said shingled articles on said conveyor means and adapted to engage behind a plurality of shingled articles on said conveyor means and being constrained to move in a predetermined direction at a second predetermined speed greater than said first predetermined speed, said pushers being adapted to push said articles in front of said pushers;

d. A retarder means including a plurality of retarders adapted to move into the path and ahead of said shingled articles on said conveyor means and constrained to be moved continuously therealong in the same predetermined direction as said pusher means at a third predetermined speed greater than zero and less than said second predetermined speed, said retarders being removable from said path and having a generally vertical rear face when in said path, whereby a batch of articles pushed by the pushers is assembled behind said moving generally vertical rear face; and,

e. Means for removing said retarders from said path when the distance between said retarders and said next approaching pushers is substantially equal to the length of each of said articles, said mechanism thereby leaving a batch of articles assembled in a stack to be taken forward on said conveyor means.

**3,964,599**

## PROCESS AND APPARATUS FOR THE CONTROLLING OF THE CONVEYANCE OF LOOSE BULK MATERIAL

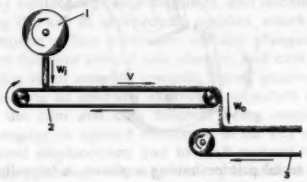
**Jean Marie van Langen, Bergen; Gerardus Wilhelmus Cornelis Jacobs, Alkmaar, and Gerrit de Jong, Velsen, all of Netherlands, assignors to Koninklijke Nederlandsche Hoogovens en Staalfabriken N.V., Ijmuiden, Netherlands**

**Filed Sept. 10, 1971, Ser. No. 179,491**

**Claims priority, application Netherlands, Sept. 10, 1970, 7013421**

**Int. Cl.² G01G 11/12**

**U.S. Cl. 198—39** **3 Claims**



1. In a process of conveying loose bulk material by a conveyor belt, which material is supplied to the belt in a fluctuating quantity independent of the speed of the belt, and has to be delivered from the belt in a flow which is as constant as possible, the improvement which comprises:

a. Supplying the material at said fluctuating rate to a single conveying belt having a non-variable length, and conveying the material to a delivery station thereby,

b. measuring the quantity of material being carried by the belt per unit of time in a region close to its said delivery station, and deriving from such measurement a first signal representative of said measurement,

c. feeding the first signal through a high-permeable filter to a proportion control device to produce a second signal representative of fluctuations in said measurement

d. providing a third signal representative of the belt speed calculated for a desired average belt load, and

e. combining said second and third signals and applying the same to adjust the belt drive in the direction to maintain said flow as nearly constant as possible.

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**3,964,600**

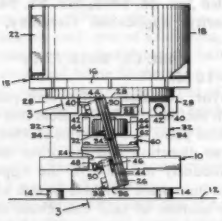
## NATURAL FREQUENCY ADJUSTMENT FOR VIBRATORY FEEDER

**Perry M. Vensel, Penn Run, Pa., assignor to FMC Corporation, San Jose, Calif.**

**Filed Oct. 17, 1974, Ser. No. 515,784**

**Int. Cl.² B65G 27/00**

**U.S. Cl. 198—220 CA** **3 Claims**



1. In an oscillating feeder of the spring coupled two mass torsional pendulum type comprising a base, a frame positioned above the base, at least three sets of leaf springs lying in separate planes inclined from vertical with one end of each leaf spring set being mounted to the base and the opposite end

of the leaf spring set being mounted to the frame for supporting the frame on the base in a manner that enables oscillatory movement of the frame in both horizontal and vertical planes, each leaf spring set including a plurality of spaced apart leaf spring arranged to twist about their longitudinal axes and bend transversely of their longitudinal axes without contacting an adjacent leaf spring,

the improvement therein comprising means clamped adjacent the base end of each set of leaf springs for adjusting the torsional natural frequency of the feeder by changing the effective length of each leaf spring set,

said adjusting means having a movable member adjacent said feeder base for adjusting said spring effective length while said springs remain mounted and effective for supporting said feeder for continuing feeder operations,

said leaf springs in each said set remaining in spaced apart relationship.

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**3,964,601**

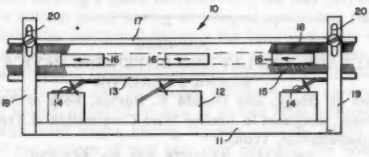
## POSITIVE FLOW VIBRATORY FEEDER

**Jack W. Armstrong, Baldwinsville, N.Y., assignor to Lipe-Rollway Corporation, Syracuse, N.Y.**

**Continuation-in-part of Ser. No. 481,125, June 20, 1974, abandoned. This application July 18, 1975, Ser. No. 597,010**

**Int. Cl.² B65G *27/00***

**U.S. Cl. 198—220 BA** **16 Claims**




1. A positive flow vibratory feeder for objects having uniform thickness, said feeder comprising:

a. a base;

b. a support element extending along a feed path and lying generally in a first plane;

c. means mounted on said base for vibrating said support element in a second plane generally perpendicular to said first plane and extending along said feed path, the direction of the vibration produced by said vibrating means being at an angle between said first plane and a third plane generally perpendicular to both said first plane and said second plane and transverse to said support element;

d. said support element being covered with a feed pile material along said feed path, said feed pile material having resilient bristles of uniform length;

e. said feed pile bristles being uniformly inclined by 5° to 25° toward the direction of feed from said third plane;

f. a holder mounted on said base and fixed relative to said support element, said holder extending generally parallel with said support element in a fourth plane generally parallel with said first plane so said holder is uniformly spaced from said feed pile material;

g. holding pile material arranged on said holder and having resilient bristles of uniform length extending toward said feed pile bristles.

h. the tips of said holding pile bristles being spaced from the tips of said feed pile bristles by slightly less than said thickness of said objects to hold said objects in engagement with the tips of said feed pile bristles during said vibration; and

i. said holding pile bristles being inclined toward said direction of feed at an angle between said third plane and said fourth plane to flex periodically as said objects move against said holding pile bristles in response to one stroke of said vibration and to urge said objects periodically toward said feed pile bristles in response to the other stroke of said vibration.

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**3,964,602**

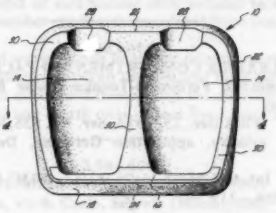
## MULTI-PURPOSE RECEPTACLE

**Harold P. Ashton, Providence, R.I., assignor to Dart Industries Inc., Los Angeles, Calif.**

**Filed Aug. 5, 1974, Ser. No. 494,671**

**Int. Cl.² B65D *1/34***

**U.S. Cl. 206—75** **6 Claims**




1. A multi-purpose receptacle particularly adapted to support, retain and restrain a variety of culinary implements used during meal preparation or service and comprising:

a curvilinear tray bounded at its peripheral edge by a supporting wall structure, said peripheral edge and supporting wall structure having a first portion that extends above all other portions thereof and a second portion that extends above some other portions thereof all along the peripheral edge of the supporting wall structure opposite that of said first portion,

said curvilinear tray having therein at least one elongated recess and a ledge adjacent one end of such recess having a continuous back wall portion formed by said supporting wall structure, said ledge in like fashion being adjacent the first portion of said peripheral edge and supporting wall structure and,

at least one opening in the second portion of said peripheral edge and supporting wall structure that extends to said recess.

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**3,964,603**

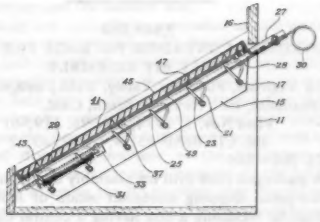
## RING DISPLAY WITH LOCKING MECHANISM

**H. R. Sandler, 4914 Brassvalley St., Houston, Tex. 77035**

**Filed Jan. 16, 1975, Ser. No. 541,502**

**Int. Cl.² B65D *1/34*; E05B *73/00***

**U.S. Cl. 206—76** **1 Claim**




1. A ring display with locking mechanism which comprises:

a case;

a plate supported by the case and including ring receiving slots;

at least one rod rotatably carried by the case and having its axis aligned generally below said slots;

a hook connected with said rod for rotation of the hook below the slots between a ring release and a ring retaining position;

an actuator carried movably by the plate, positioned between the plate and rod, movable in a plane parallel to the

plate and in directions substantially perpendicular to the axis of the rod;

a linkage bar attached to the rod extending upwardly through an aperture in the actuator and forming a pivotal connection, whereby moving the actuator perpendicular to the axis of the rod rotates the hook between said positions;

a spring connected between the actuator and case urging the actuator inwardly in a ring retaining position.

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**3,964,604**

## FLEXIBLE COMPARTMENTED PACKAGE

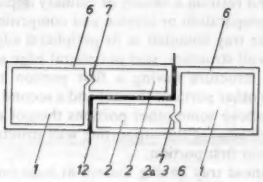
**Kurt Prenntzell, Ferdinand-Tonnies-Strasse 8, 242 Eutin, Germany**

**Filed Dec. 23, 1974, Ser. No. 535,304**

**Claims priority, application Germany, Dec. 21, 1973, 2363904**

**Int. Cl.² B65D** *25/08, 81/32;* **G03C** *1/48*

**U.S. Cl. 206—219** **10 Claims**




1. A flexible compartmented package comprising a primary chamber constituting a reaction or mixing chamber and at least one secondary chamber adapted to be filled with a substance to be transferred to the primary chamber, a sealed seam separating said primary chamber from said secondary chamber and having an intergral rupturable seam portion capable of being destroyed for establishing communication between said primary and secondary chambers, said rupturable seam portion being in the form of a nose protruding into said secondary chamber and having a tapered tip, said secondary chamber being entirely enclosed by said sealed seam to provide a pressure compartment for rupturing said nose and forcing said contained substance from said secondary chamber toward said first chamber when the walls of said secondary chamber are depressed.

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**3,964,605**

## PROTECTIVE CONTAINER PACKAGE FOR A ROCK DRILL BIT ASSEMBLY

**Edward Vezirian, Fountain Valley, Calif., assignor to Smith International, Inc., Newport Beach, Calif.**

**Filed Nov. 1, 1974, Ser. No. 519,981**

**Int. Cl.² B65D** *85/54, 65/02, 43/12*

**U.S. Cl. 206—349** **13 Claims**

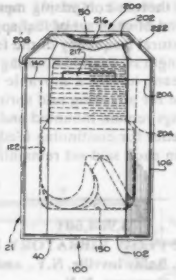
8. A packaged rock drill bit assembly comprising:

a two-piece shipping container made of molded plastic material including a box having a central cavity therein and a plurality of gussets disposed around the lower periphery of said central cavity, a cover having a downwardly depending cylindrical flange adapted for vertical sliding insertion within said box cavity, and means provided on said box and said cover for rotationally indexing said cover to said box;

a rock drill bit assembly having a lower portion of relatively greater diameter disposed within said box cavity, and an upper portion of relatively lesser diameter disposed within said cover flange, said lower portion having bottom surfaces received upon and supported by respective ones of said gussets;

a relatively thin heat shrinkable plastic envelope disposed about said container and being shrunk thereupon;

a strap wrapped vertically about said container and plastic envelope; and




said container cover having a recess in its upper surface beneath said strap;

whereby said strap may be utilized for lifting said container, and a person's fingers may then be inserted under said strap and within said recess.

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**3,964,606**

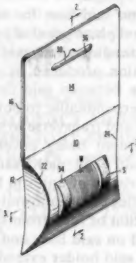
## PACKAGE, DISPLAY AND DISPENSING DEVICE AND BLANK THEREFOR

**James W. Hogg, and Donald E. Burton, both of Nashville, Tenn., assignors to Anchor Wire Corporation of Tennessee, Goodlettsville, Tenn.**

**Filed Mar. 31, 1975, Ser. No. 565,729**

**Int. Cl.² B65D** *85/671, 85/04*

**U.S. Cl. 206—395** **10 Claims**

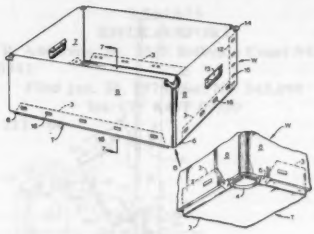


1. A package and dispensing device for a spool having material wound thereon comprising front and rear panels connected to each other along the top and bottom thereof, a closing flap along each side edge of each said panel and connected thereto by arcuate fold lines, the outer edge of each flap being arcuate, one said flap at each side being folded inwardly on one said arcuate fold line and having its outer arcuate edge engaged against the inside surface of the opposite panel, and the other flap at said side overlying the last mentioned flap, said flaps form concave side walls, at least one of said panels having a window therein, and a spool having material wound thereon positioned between said concave side walls, adjacent said window which permits removal of said material from said spool, said window has a greater length than the axial length of the spool and has a width less than the maximum diameter of the spool to permit projection of a portion of said spool therethrough.

## 3,964,607
## BOTTLE CARRIER CASE AND SUPPORT TRAY THEREFOR

Gary L. Wagner, Covington, La., assignor to Crown Zellerbach Corporation, San Francisco, Calif.

Filed Aug. 6, 1973, Ser. No. 385,856
Int. Cl.² B65D *15/22, 81/00, 1/36*
U.S. Cl. 206—427 4 Claims

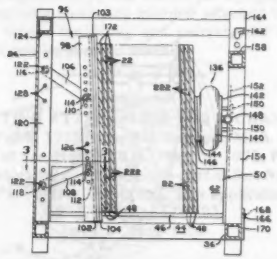


1. A bottle carrier case comprising a paperboard wall part and a bottle support tray part of integrally molded moisture-proof plastic material fixedly attached together; the wall part comprising connected walls each formed of inner and outer wall panels forming a space therebetween; the tray part comprising a bottom panel having an integral upstanding flange along each edge positioned between the inner and outer wall panels of a wall, and a plurality of spaced apart ledges integral with and projecting laterally outwardly beyond the outer faces of said tray flanges with each ledge substantially in alinement with the bottom panel of the tray at an end of an upstanding tray flange, said ledges having support surfaces above the plane of the bottom of said tray part engaging the bottom edges of the outer paperboard wall panels of the wall part to maintain said panel edges out of contact with a surface upon which the case may be supported and thus preclude wicking through said edges of moisture which may be on said support surface; and means securing the tray flanges and the wall panels together.

## 3,964,608
## ADJUSTABLE BACK SUPPORT FOR SHIPPING BINS

James R. Rowley, Freeport, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed July 15, 1974, Ser. No. 488,347
Int. Cl.² B65D *85/48*
U.S. Cl. 206—451 9 Claims

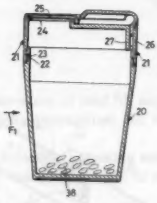


1. A back support for an article shipping bin, the bin being of the type having a backwall secured to a base, comprising:
a rigid support member;
fixed point means mounting the backwall of the bin and said rigid support member; and
means for maintaining said rigid support member in spaced relation to the backwall of the bin, said maintaining means comprising:
a first strut having a first end secured to the backwall of the bin at a first one of said fixed point means and the opposite end of said first strut secured to said rigid support member at a second one of said fixed point means;
a second strut having a first end secured to the backwall of the bin at a third one of said fixed point means and the opposite end of said second strut secured to said rigid support member at a fourth one of said fixed point means; and
said first and second struts in spaced relation to each other and the distance between the first and third ones of said fixed point means is different than the distance between the second and fourth ones of said fixed point means.

## 3,964,609
## DISPENSING CONTAINER ASSEMBLY

Emilio Perrella, via S. Carlo, Segrate (Milan), Italy

Filed Dec. 3, 1973, Ser. No. 420,898
Claims priority, application Italy, Dec. 28, 1972, 33773/72
Int. Cl.² B65D *83/04, 43/16*
U.S. Cl. 206—540 8 Claims



1. A container assembly for dispensing small articles such as pills, lozenges or the like, comprising:
a container body;
a dispensing-cap on said container body including a closure wall overlying said container body, said dispenser-cap including a dispensing-aperture at one side of said closure wall and above said closure wall; and
a manually-operable lid assembly mounted on said dispensing-cap, said lid assembly comprising a lid juxtapositonable over said dispensing aperature for retaining the contents of the container in the container.
transverse hinge means on said lid and pivotally mounted on said dispenser-cap adjacent the juncture of the dispensing-aperture and the closure wall,
an operating arm operatively connected to said transverse hinge means and overlying said closure wall, and
a second arm operatively connected to said operating arm and depending therefrom and mounted on said dispensing-cap, said arms including a resilient portion therebetween whereby manual pressure on said operating arm depresses the arm toward said closure wall pivots the lid off said dispensing-aperture at the transverse hinge means, and release of manual pressure on the operating arm tends to cause the lid to pivot onto the dispensing aperture and the operatng lever to overly the closure wall.

## 3,964,610
## LOCKING BICYCLE RACK

Arnold F. Deiner, 388 Ave. X, Brooklyn, N.Y. 11223

Continuation-in-part of Ser. No. 413,535, Nov. 7, 1973, abandoned. This application Nov. 25, 1974, Ser. No. 526,947
Int. Cl.² B62H *3/08*
U.S. Cl. 211—5 12 Claims

1. A locking bicycle rack comprising:
a. a U-shaped member having first and second parallel side walls and a bottom portion, said first and second parallel

side walls being of a length greater than the nominal spacing between the axles on the largest bicycle to be protected by the bicycle rack and of a height greater than the height of said axles from the ground;

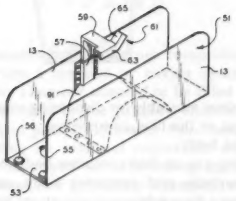
b. means for securing said bottom portion of said U-shaped member to a solid base, thereby securing said side walls to permit a bicycle to be placed therebetween;

c. a vertically adjustable locking bar comprising an L-shaped member having a vertical portion, said vertical portion being held against one of said side walls by a channel-shaped member attached to said side wall, and a horizontal portion extending to a position over the mid-point between said side walls, said horizontal portion having means thereon for engaging the frame of a bicycle comprising a channel-shaped member having a horizontal portion and an angled portion, the former adapted to engage the horizontal bar on a boy's bicycle and the latter to engage the angled bar on a girl's bicycle; and

d. means to lock said locking bar in place, whereby said locking bar may be moved up to permit placing a bicycle between said walls and then lowered against the bicycle frame to prevent it or portions thereof from being stolen.

**7.** A locking bicycle rack comprising:

a. a U-shaped member having first and second parallel side walls and a bottom portion, said first and second parallel



side walls being of a length greater than the nominal spacing between the axles on the largest bicycle to be protected by the bicycle rack and of a height greater than the height of said axles from the ground;

b. means for securing said bottom portion of said U-shaped member to a solid base, thereby securing said side walls to permit a bicycle to be placed therebetween;

c. a vertically adjustable locking bar comprising an L-shaped member having a vertical portion, said vertical portion being held against one of said side walls by a channel-shaped member attached to said side wall, and a horizontal portion extending to a position over the mid-point between said side walls, said horizontal portion having means thereon for engaging the frame of a bicycle; and

d. means to lock said locking bar in place comprising a coin-operated lock having a bolt, said lock being attached to the side of said side wall opposite said locking bar, said side wall having a hole formed therein through which the bolt extends, and the vertical portion of said locking bar containing a plurality of holes which said bolt can engage, whereby said locking bar may be moved up to permit placing of bicycle between said walls and then lowered against the bicycle frame to prevent it or portions thereof from being stolen.

**3,964,611**

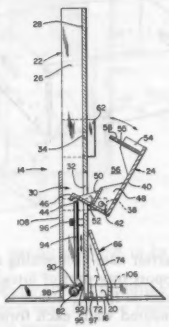
## BICYCLE RACK

**Ralph W. Galen, 131 Mount Auburn, Cambridge, Mass. 02138, and John A. Vanderpoel, Crescent Road, Concord, Mass. 01742**

**Continuation-in-part of Ser. No. 406,016, Oct. 12, 1973, Pat. No. 3,865,244. This application Feb. 10, 1975, Ser. No. 548,533**

**Int. Cl.² A47F** *7/04*; **B62H** *3/08*

**U.S. Cl. 211—5** **11 Claims**



**1.** A device for supporting and holding a bicycle comprising:

channel means for receiving the front and rear wheels of a bicycle;

a support member fixed with respect to said channel means and extending at an angle thereto;

clamp means pivotally mounted to said support member for locking a portion of the frame of said bicycle to said support member and

wheel locking means cooperative with said clamp means for engaging at least one of said bicycle wheels received by said channel means and locking said wheel to said channel means, said wheel-locking means being movable into and out of wheel locking position responsively to the pivotal movement of said clamp means.

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**3,964,612**

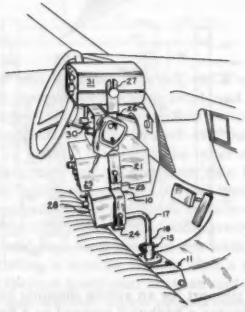
## EQUIPMENT SUPPORT ASSEMBLY

**Robert T. Skilliter, Jr., and Anthony P. Pietrowski, both of Genoa, Ohio, assignors to Acme Specialty Manufacturing Company, Toledo, Ohio**

**Filed Jan. 27, 1975, Ser. No. 544,373**

**Int. Cl.² B60R** *7/04*, *7/00*, *11/02*

**U.S. Cl. 211—26** **11 Claims**



**1.** An equipment support assembly, comprising, in combination, a mounting bracket defining a first generally vertical axis, a post having first and second ends, a generally vertical por-

tion adjacent said first end and a generally horizontal portion adjacent said second end, said first end of said post being adjustably mounted on said mounting bracket for rotation about such first vertical axis, a deck assembly adjustably mounted adjacent said second end of said post for rotation about a second generally vertical axis, said deck assembly including at least one holder unit, said holder unit including a generally U-shaped base assembly having spaced vertical arms which are laterally adjustable.

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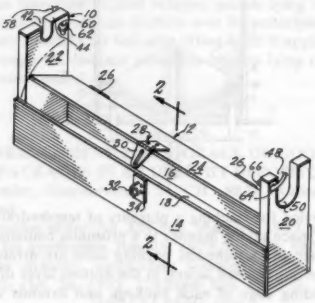
**3,964,613**

## RIFLE SUPPORT

**William R. Anderson, Jr., 1648 Bethesda Court NE., Atlanta, Ga. 30341**

**Filed Jan. 20, 1975, Ser. No. 542,099**
**Int. Cl.² A47F 07/00**
**U.S. Cl. 211—64** **7 Claims**



**1.** In a rifle support for a rifle having a stock and a barrel: an elongated base having spaced, opposed rifle supports thereon consisting only of end panels extending substantially vertically upwardly above the top of the base when the bottom of the base is resting on a surface and each of said panels terminating a short distance above the base and having an open top leading into a substantially vertical depression therein for supporting respective ends of a rifle placed with part of the stock of the rifle in one depression and part of the barrel of the rifle in the other depression, the end panel depression having the stock of the rifle therein being shaped to fit the rifle stock snugly and being larger than the other depression thereby to accommodate the stock portion of the rifle snugly in the larger depression whereas the other smaller depression supports the fore end of the rifle barrel so that the rifle extends between the said end panels in a stable elongated position whereby work may be performed thereon without the rifle moving significantly, and means for carrying said rifle support comprising a carrying member attached to said base providing a means for lifting and carrying the entire rifle support from one location to another.

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**3,964,614**

## LIFTING ATTACHMENT FOR A CRANE

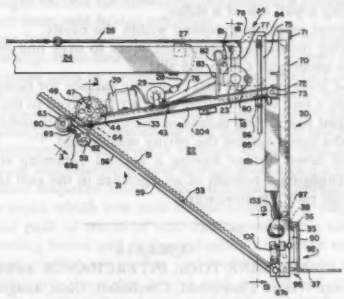
**Forrest D. Welch, 1715 Stone St., Saginaw, Mich. 48602**

**Division of Ser. No. 251,926, May 10, 1972, Pat. No. 3,907,142, which is a continuation-in-part of Ser. No. 175,170, Aug. 26, 1971, Pat. No. 3,760,963. This application Nov. 14, 1974, Ser. No. 523,703**
**Int. Cl.² B66F 9/06**
**U.S. Cl. 212—9** **2 Claims**

**1.** In combination with a boom on a crane characterized as including a control line, the improvement comprising a materials handling apparatus which is mobile with said boom to provide a lift capability to the crane, said apparatus being free from supportive engagement with any support member of the crane other than the free end of the boom and comprising:

lift means, said lift means including a lift member operable by said control line for receiving loads on said lift member;

automatic leveling means for positively and mechanically selectively orienting said lift means independent of said boom to maintain said lift member and any loads thereon in about a predetermined orientation, said leveling means being operable while said boom is mobile and in response to the position of either said boom or a selected portion of said apparatus sensed by sensor means and further characterized in that said leveling means automatically



maintains the orientation of said lift means and any loads thereon substantially throughout the range of throw of said boom;

power means for selectively actuating said leveling means, said power means being responsive to said sensor means; and

securing means for securing said apparatus to the boom of the crane, said securing means serving to rigidly attach said apparatus to the free end of the boom and being the only means for supporting and securing the apparatus to the boom.

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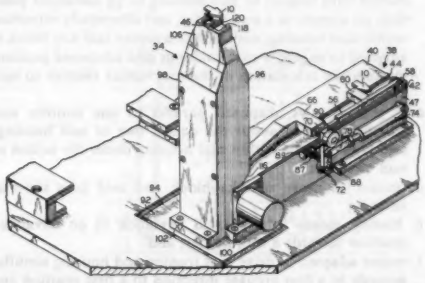
**3,964,615**

## APPARATUS FOR POSITIONING SLIDERS

**Richard R. Silvis, Meadville, and John A. Ettinger, Conneaut Lake, both of Pa., assignors to Textron, Inc., Providence, R.I.**

**Filed July 1, 1974, Ser. No. 484,906**
**Int. Cl.² B23P 19/04**
**U.S. Cl. 214—1 B** **7 Claims**



**1.** An apparatus for positioning a slider in a slider assembly station, comprising

support means defining a work area,

guide means forming a vertical slide path extending upward from the support means,

an elongated member,
means for longitudinally moving the elongated member from a lowered position to a raised position in the vertical slide path,
said elongated member having means for receiving and supporting a slider on the upper end of the elongated member,
means for transferring a slider to the receiving and supporting means of the elongated member when the elongated member is in the lowered position,
said elongated member in the raised position protruding substantially above the support means,
said elongated member having a cavity and a slot for receiving a pull tab of a slider,
a lever pivotally mounted within the cavity,
spring means for biasing the lever to urge one end against a slider pull tab in the slot,
said lever having a first camming surface for being engaged by a pull tab of a slider as it is transferred to the receiving and supporting means of the elongated member to pivot the lever against the spring means, and
said lever further having a second camming surface for engaging a bottom of an aperture in the pull tab to urge the pull tab downward.

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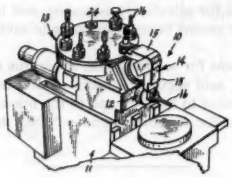
**3,964,616**

## MACHINE TOOL INTERCHANGE ARM

**Tadeusz Wiktor Piotrowski, Cincinnati, Ohio, assignor to Cincinnati Milacron, Inc., Cincinnati, Ohio**

**Filed Sept. 29, 1975, Ser. No. 617,960**
**Int. Cl.² B23Q *5/32, 3/157***
**U.S. Cl. 214—1 BD** **2 Claims**



1. In an automatic tool changer utilized on machine tools and employing arms rotatably carried on a rotary trunion within said tool changer, an improved interchange arm, comprising in combination:
a. a housing, journaled at one end about said rotary trunion;
b. a key block, slidably maintained within a track along the centerline in said housing, wherein said key block can be moved with respect to said housing to an advanced position, proximate to a tool holder, and alternately retracted within said housing, and further wherein said key block is adapted to engage a tool holder at said advanced position to maintain orientation of the tool holder relative to said keyblock;
c. a pair of jaws, disposed parallel to one another and equally disposed about the center line of said housing, said jaws slidable within said housing under the action of said keyblock;
d. means to move said keyblock and said jaws simultaneously;
e. biasing means to urge said keyblock to an advanced position towards a tool holder; and
f. means adapted to drive said trunion and housing simultaneously in a first arcuate direction to a first position and further wherein said means is adapted to alternatively drive said trunion and said housing simultaneously in a second arcuate direction to a second position, wherein said housing is held stationary at said second position and said trunion is driven in said second arcuate direction through an overtravel increment, wherein said overtravel increment is converted into retraction movement of said keyblock and said jaws, overcoming said biasing means.

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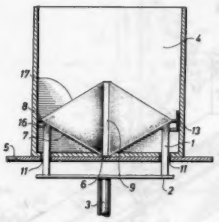
**3,964,617**

## ARRANGEMENT FOR THE STACKING IN A SPACE-SAVING MANNER OF TETRAHEDRAL PACKING UNITS IN A PRISMATIC COLLECTIVE CONTAINER

**Leif B. Pettersson, Staffanstorp, Sweden, assignor to AB Ziristor, Lund, Sweden**

**Filed Nov. 13, 1974, Ser. No. 523,543**
**Claims priority, application Sweden, Dec. 18, 1973, 73170532**
**Int. Cl.² B65D *85/54*; B65G *1/14***
**U.S. Cl. 214—10.5 R** **7 Claims**



1. A device for stacking a plurality of tetrahedral packing units in a space saving manner in a prismatic container therefor in which the tetrahedral packing units are arranged in a plurality of superposed layers, in the bottom layer of which a corresponding edge of each package unit extends vertically substantially along the vertical axis of the prismatic container and parallel to each other, the lower end of the corresponding edges resting on the bottom of the prismatic container, the upper layers being arranged in alternate nesting relation with the bottom layer, said device comprising a plurality of retractable support means for insertion into and withdrawal from the prismatic container through openings provided therein for receiving said retractable support means, said support means, when inserted into the prismatic container during stacking of the tetrahedral units therein, supporting each tetrahedral packing unit in the bottom layer on the lower surface of each such unit, and means for inserting and subsequently withdrawing said support means after stacking said plurality of tetrahedral packing units in said prismatic container the upper layers of the tetrahedral packing units preventing displacement of the units in the bottom layer when said support means is withdrawn.

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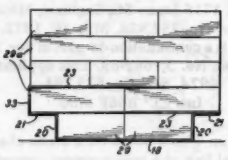
**3,964,618**

## PALLET DEVICES AND METHOD

**John E. Dreyer, R.R. 1, Sugar Grove, Ill. 60554**

**Filed Dec. 12, 1974, Ser. No. 531,881**
**Int. Cl.² B65G *1/14***
**U.S. Cl. 214—10.5 R** **11 Claims**



1. A pallet device formed from sheet-form semi-rigid material, comprising:

a base panel adapted to be placed for loading into a form jig having a horizontal base and upstanding spaced apart rigid form flange means;

respective riser panels connected along opposite sides of the base panel and adapted to be held upright by said form flange means;

a fork lift shoulder panel connected to the edge of each of said riser panels which is remote from said base panel, and adapted to project in overhanging relation laterally outwardly from the associated form flange in the jigged relation of the device for engagement by lift fork arms;

respective retainer panels wider than the shoulder panels arranged to overlie each of the shoulder panels and to extend inwardly into overhanging relation to the base panel and to engage with objects loaded onto said base panel between said riser panels, and the retainer panels then being interlocked with said objects by placing other objects in loading relation on top of the retainer panels;

means attaching said retainer panels to said shoulder panels;

and at least one of said retainer panels lying in mutually reinforcing laminar relation over its underlying shoulder panel whereby lift fork arm lifting force is applied directly through the laminar panels to objects lying on said one retainer panel.

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**3,964,619**

## ARRANGEMENT FOR STORAGE OF GOODS IN PACKAGES IN AN UPRIGHT DEPOSITORY

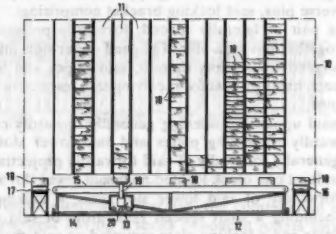
**Felix Irmler, Oberdorstrabe 21, CH - 8820, Wadenswil, Switzerland**

**Continuation of Ser. No. 339,965, March 9, 1973, abandoned. This application July 25, 1975, Ser. No. 599,189**

**Claims priority, application Germany, Mar. 13, 1972, 2212085; Oct. 26, 1972, 2252584; Feb. 1, 1973, 2304975**

**Int. Cl.² B65G *1/04***

**U.S. Cl. 214—16 B** **7 Claims**



1. Apparatus for storing and removing packages of goods at an upright depository comprising:

a floor;

a plurality of upright storage units;

means mounting said plurality of storage units in side-by-side relation to form a row, there being a plurality of adjacently located rows of storage units defining a matrix;

each storage unit defining a vertical storage chamber having a cross section sized to receive and store a single stack of said packages;

said storage units each having selectively releasable support means projecting into the cross section of the storage unit adjacent a lower end thereof, said support means being arranged to support an entire stack of packages in such storage unit independently of packages stored in other storage units in the same row;

means mounting said storage units at a distance above said floor at a predetermined distance;

a transfer conveying system for delivering and removing packages to and from said storage units comprising:

a bridge conveyor disposed on said floor beneath said matrix of storage units, said bridge conveyor including an endless conveyor belt means;

means for moving said bridge conveyor from one row to another so that said conveyor belt means is selectively alignable with a plurality of the rows of storage units so as to extend beneath and across each selected row;

means mounting said endless conveyor belt means from the lower ends of said storage units by a distance which is at least equal to the height of at least one of said packages;

loading and unloading conveyors located at opposite ends of said bridge conveyor and at substantially the same height thereof for delivering and removing packages to and from said bridge conveyor;

means for moving said conveyor belt means to convey a package from said loading conveyor belt along a row of storage units to a selected storage unit thereof, and to receive a package from a selected storage unit and convey such package to said unloading conveyor; and

a traveling loading-unloading unit mounted on said bridge conveyor for movement relative to said bridge conveyor and relative to said storage units along a path of travel disposed below a selected row of storage units beneath which row said bridge conveyor is disposed, said path of travel of said loading-unloading unit extending below and along a plurality of storage units in said selected row so that said loading-unloading unit is selectively locatable below said plurality of storage units in said selected row, said loading-unloading unit including a raisable and lowerable member oriented relative to said endless conveyor belt means to:

raise a package from said endless conveyor belt means into a selected one of said storage units, exclusive of other storage units in said selected row, to a height therein at least above the level of said releasable support means of said selected storage unit so that said package lifts and supports packages located thereabove and is then itself supported by said releasable support means, and lower a bottom package from a selected storage unit exclusive of other storage units in said selected row onto said endless conveyor belt means for conveyance to said unloading conveyor belt.

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**3,964,620**

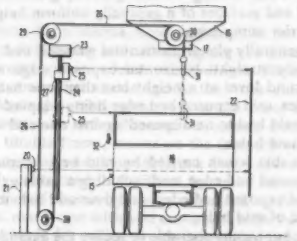
## VEHICLE LOADING APPARATUS AND METHOD

**Ward H. Parsons, 1202 Green Glen Road, Birmingham, Ala. 35216**

**Filed Jan. 13, 1975, Ser. No. 540,338**

**Int. Cl.² B65G *67/06***

**U.S. Cl. 214—41 R** **19 Claims**



7. A method for loading open top vehicles in succession with flowable solids from an overhead source of such solids comprising advancing each vehicle to a loading station below said overhead source and in so doing detecting the presence of the vehicle at the loading station, stopping the vehicle, and lowering a vehicle load level sensor, detecting the top edge of

the vehicle body while lowering said sensor and thereby stopping said lowering with the sensor positioned properly relative to the vehicle to regulate the load level therein, delivering flowable solids from said overhead source into the top of the stopped vehicle and continuing the delivery until the level of solids in the vehicle displaces the load level sensor, and then terminating said delivery, and advancing the vehicle sufficiently to allow the load level sensor to return to a non-sensing position separated from the solids in the vehicle, and again delivering said solids from said overhead source until the load level sensor is again displaced.

**10.** Apparatus for loading vehicles with flowable solids comprising a supply source of said solids at a vehicle loading station, a first detector means adjacent the loading station to detect the presence of a vehicle entering the loading station, a second detector means and a coordinated vehicle load level sensor, means to lower and to raise the second detector means and said load level sensor in unison responsive to the operation of the first detector means, and means responding to the operation of the second detector means when the latter detects the top of a vehicle body to be loaded at the loading station to terminate the lowering of the second detector means with the load level sensor with the sensor at a proper elevation to regulate the level of flowable solids in said vehicle body and to initiate delivery of flowable solids from said supply source to said vehicle body.

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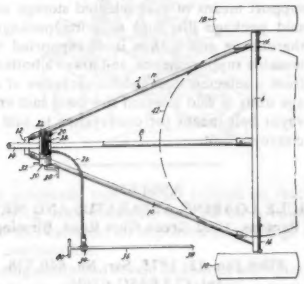
## 3,964,621
## BALE LIFTER AND CARRIER

**John H. Youngkamp, Sedalia, Mo., assignor to Leland B. Bock, Sedalia, Mo.**

**Filed Jan. 27, 1975, Ser. No. 544,405**
**Int. Cl.² B60P *1/00***
**U.S. Cl. 214—85.5** **1 Claim**



**1.** A lifter and carrier for large bales of hay or the like each having, when resting on the ground, generally planar and vertical end surfaces of a generally uniform height, said lifter and carrier comprising:

a. a generally planar, horizontal wheeled bed having a generally straight, horizontal exposed edge spaced above ground level at a height less than one half that of said bales, said exposed bed edge being adapted by movement of said bed to be disposed against one end surface of one of said bales,

b. a cable winch carried by said bed remotely from said exposed bed edge, and including a cable extendable over said exposed bed edge, and over said bale to the opposite end of said bale,

c. anchor means operable to secure the extended end of said cable to said opposite end of said bale, whereby as said cable is retracted by said winch, said bale will first be pulled against said exposed edge of said bed, and then tilted upwardly and inwardly over said exposed edge to be lifted to and supported by said bed, and whereby as said bale is tilted over the exposed edge of said bed, it will slip downwardly laterally of said edge to a position wherein it is generally balanced on said edge when tilted sufficiently to rest on said bed, said anchor means comprises an elongated rod adapted to be inserted horizontally into said opposite end of said bale and to project therefrom, the free end of said cable being attached to the projecting end portion of said rod, and

d. means operable to lock said cable winch at any desired extension of said cable therefrom.

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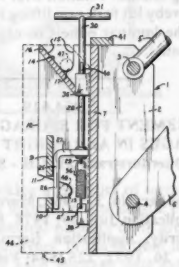
## 3,964,622
## QUICK CHANGE MOUNTING BRACKET FOR LOADER ARMS

**Calvin B. Blair, Barnard, and Donald C. Hokr, Lincoln, both of Kans., assignors to Kent Manufacturing Co., Inc., Tipton, Kans.**

**Filed Mar. 17, 1975, Ser. No. 558,831**
**Int. Cl.² E02F *3/70***
**U.S. Cl. 214—145 A** **8 Claims**



**1.** A locking bracket for loader arms and adapted to engage an implement bracket having upper and lower, spaced apart, transverse pins, said locking bracket comprising:

a. a pair of laterally spaced, forwardly projecting plates together having a pair of aligned upper slots and a pair of aligned lower slots therein, said upper and lower slots each having a seat for receiving said respective transverse pins,

b. said upper slot opening generally upwardly of said forwardly projecting plates and said lower slots opening generally forwardly of said forwardly projecting plates,

c. at least one block located near said lower slot and spaced forwardly of said lower slot seats, a locking member including a shaft spaced rearwardly of said upper slot seats and a locking plate mounted on said shaft and having a locking portion spaced forwardly of said lower seats and rearwardly of said block, said shaft being adapted for selectively moving said locking portion to a slot blocked position between said block and one of said lower pins with said lower pins in said lower slot seats, and

d. means for securing said forwardly projecting plates to said loader arms,

e. whereby said upper and lower pins are selectively locked in said forwardly projecting plates when received in said seats.

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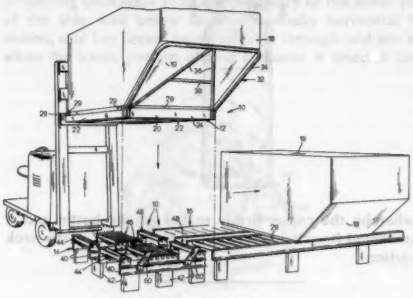
## 3,964,623
## PALLET-PALLETIZER ASSEMBLY

**Gene D. Verhein, 2435 Mill Road, and Donald Verhein, 2116 Peninsula Road, both of Oconomowoc, Wis. 53066**

**Filed Feb. 12, 1975, Ser. No. 549,298**
**Int. Cl.² B65G *47/04***
**U.S. Cl. 214—310** **7 Claims**

**1.** A pallet palletizer assembly for positively locating a pallet in alignment with a conveyor, said assembly comprising a pallet and a palletizer, said pallet including a frame, a pair of tine ways located within said frame in a parallel spaced rela-

tion, said tine ways being open at the ends to receive the tines of a fork lift truck, said palletizer including a pair of rectangular frames, a number of roller assemblies mounted on each of said frames in parallel spaced relation to define spaces for



receiving said tine ways, and means on one of said rectangular frames for guiding said pallet into the spaces between said roller assemblies, whereby said pallet can be seated on the palletizer frame below the level of the upper surfaces of the roller assembly and in alignment with the conveyor.

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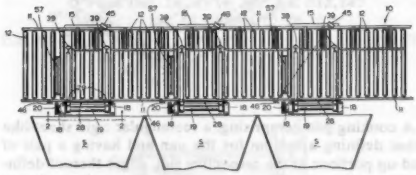
**3,964,624**

## CONTAINER DUMPING APPARATUS

**Albert W. Werder, St. Louis, Mo., assignor to Alvey Inc., St. Louis, Mo.**

**Filed Dec. 18, 1974, Ser. No. 533,880**
**Int. Cl.² B65G *65/04***
**U.S. Cl. 214—314** **4 Claims**



**1.** In container dumping apparatus, the combination comprising: a conveyor having a series of spaced rollers forming a continuous path for the travel of open top tote pans; roller drive means in said conveyor in driving engagement with said rollers at one side of the path of pan travel; a frame in said conveyor defining a pan dump station, said frame having a column disposed at the opposite side of the path of pan travel from said roller drive means; a shaft supported in said column with its axis parallel to the path of pan travel; reversible motor means operably connected to said shaft to oscillate said shaft between raised dump position and lowered home position; tote pan dump means having a pair of arms carried by said shaft in spaced apart relation with pan lift portions which in the shaft home position normally extend toward said roller drive means and are recessed between said conveyor rollers to be below the pans, and support arm portions carried on an extending outwardly at right angles to said pan lift portions and disposed adjacent said opposite side of said path of pan travel adjacent said shaft; first pan engaging vacuum means carried by each of said support arm portions in fixed positions; second pan engaging vacuum means operably mounted on each of said pan lift arms portions to move between retracted positions and pan engaging positions; resilient means connected to said second vacuum means urging them toward pan engaging positions; position control means connected to said second vacuum means and to said frame and operable to oppose said resilient means and move said second vacuum means to retracted positons; vacuum lines connected to said first and second pan engaging vacuum means to develop a suction grip upon a tote pan by and between said first and second vacuum means; and control means in said vacuum lines responsive to oscillation of said shaft in a direction to raise the pan lift arm portions out of the normally lowered home position recessed between said conveyor rollers to establish a vacuum at each of said first and second vacuum means, said raising of said pan lift arm portions causing the pan to shift against said first pan engaging vacuum means and causing said position control means to yield to said resilient means and allow said second pan engaging vacuum means to move into pan engagement.

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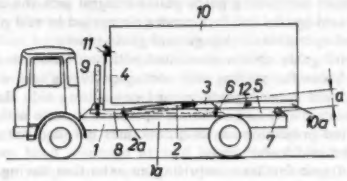
**3,964,625**

## APPARATUS PROVIDED AT A VEHICLE FOR TILTING AND LOADING AND UNLOADING A RECEPTACLE BY A ROLLING ACTION

**Herbert A. Wirz, Uetikon am See, Switzerland, assignor to Ernst Wirz AG, Kipper- & Maschinenfabrik, Uetikon am See, Switzerland**

**Filed Jan. 6, 1975, Ser. No. 538,434**
**Claims priority, application Switzerland, Jan. 15, 1974, 511/74**
**Int. Cl.² B60P *1/28***
**U.S. Cl. 214—502** **4 Claims**




**1.** An apparatus for a vehicle, especially a truck, for tilting a container and for loading and unloading the container by a rolling action, comprising at least one hydraulic lift mechanism pivotably connected at one end to the truck chassis, a tiltable front frame pivotably connected to the other end of said lift mechanism, an extensible and retractable hook arm guided in said tiltable frame, means on the front end of said container for engaging a hook on said hook arm, a rear tiltable frame pivotably connected to the front frame by means of a pivot axle and to said chassis by a pivot axle, locking elements for locking said rear frame with said container, rollers on said last named pivot axle for rolling the container during loading and unloading; an auxiliary support hingedly connected at one end to said front frame, and a hydraulic auxiliary lift mechanism hingedly connected to the other end of said support, said auxiliary lift mechanism acting via said auxiliary support both at the start of the tilting movement and also at the start of the unloading movement upon the hook arm and the container and assisting both the start of the tilting movement as well as also the start of the unloading movement.

## 3,964,626
## TRUCK FOR HANDLING CONTAINERS

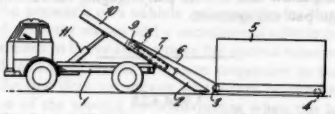
**Jose Luis Loidi Arregui, Bilbao, Spain, assignor to Asteko S/A, Bilbao, Spain**

**Continuation of Ser. No. 321,276, Jan. 5, 1973, abandoned. This application Nov. 8, 1974, Ser. No. 522,089**

**Claims priority, application Spain, Jan. 8, 1972, 175995[U]; Apr. 26, 1972, 179781[U]**

**Int. Cl.² B60P *1/28***

**U.S. Cl. 214—505** **3 Claims**



1. Apparatus for loading and unloading containers onto and from a vehicle comprising:

a. a tilting frame mounted on said vehicle and having a plurality of longitudinal beams, the outermost beams having at least one outward projection positioned towards the vehicle rear which has at least its end located towards the vehicle rear beveled;

b. means for tilting said frame;

c. means for loading a container onto and unloading a container off said frame including:

i. a single fluid cylinder and piston disposed longitudinally on said frame;

ii. at least one first pulley mounted on said piston and at least one second pulley mounted on said cylinder;

iii. first guide means associated with said piston and beams for guiding said piston and said at least one first pulley during extension of the piston, said first guide means comprising guide plates integral with the inside of said beams and fork means connected to said piston and operative to engage said guide plates;

d. second guide means associated with said container and said frame for guiding said container during said extension, said second guide means comprising side flanges associated with said container operative to mate with said beveled projections as said container is rolled onto and slid on said frame; and

e. said frame further comprising an extension having beveled portions at the remote end thereof and wheels mounted thereon, said beveled portions and wheels being operative to permit said extension to roll on the surface on which the vehicle stands when said frame is tilted.

## 3,964,627
## CONTAINER FOR AN INJECTION LIQUID, IN THE FORM OF A FLASK CLOSED BY A CURL-ON CAP

**Werner Hennings, Bunde, Germany, assignor to Bunde Glass GmbH, Bunde, Germany**

**Filed Oct. 15, 1973, Ser. No. 406,428**

**Claims priority, application Germany, Dec. 15, 1972, 7245858[U]**

**Int. Cl.² B65D *41/50***

**U.S. Cl. 215—247** **9 Claims**

1. A container for an injection liquid comprising:

a. a bottle including a mouth having an outwardly extending flange disposed completely around said mouth. and a reduced neck portion having an outer surface area with a plurality of parallel axially aligned recesses disposed around the circumference of said neck portion, and

b. a cap composed of a material that is flowable when heat is applied thereto and having an external and an internal surface,

c. said material of the cap being conformed in contiguous relationship along its internal surface to the recesses of the outer surface area of the neck portion,

d. whereby the cap is firmly seated on the bottle and is prevented from being twisted while disposed on the neck portion.

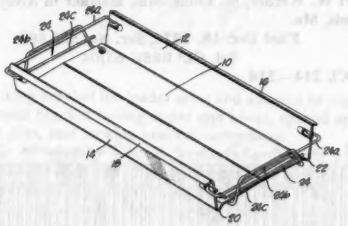
## 3,964,628
## COOKING PAN

**James D. Wilson, Newport Beach, Calif., assignor to Banner Metals Division of Intercole Automation, Inc., Compton, Calif.**

**Filed Jan. 14, 1975, Ser. No. 540,816**

**Int. Cl.³ B65D *7/20, 1/34***

**U.S. Cl. 220—19** **5 Claims**



1. A cooking pan comprising: a rectangular rigid sheet-like member defining a bottom for the pan and having a pair of turned-up portions at the respective side edges thereof defining side members for the pan; and a wire-formed member at each end of the pan loosely crimped into oversize holes in the ends of the bottom and of the side members, each wire-formed member including a first wire rod extending transversely across the end of the pan and having its ends crimped into oversize holes in the ends of the side members so that the wire rod forms a loose, sliding fit with the side members in a point contact relationship, and each wire-formed end member including a further wire rod which has its ends crimped into oversize holes in the bottom to form point contacts with the bottom, so as to minimize the formation of any area which could harbor bacteria.

## 3,964,629
## COMBINED DECANTER AND TRAY

**John H. McCabe, Worcester, Mass., assignor to Fox Specialty Co., Inc., Worcester, Mass.**

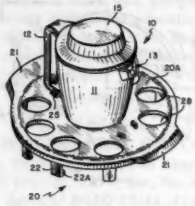
**Filed June 23, 1975, Ser. No. 589,071**

**Int. Cl.³ B65D *1/02*; A47G *19/32, 23/08***

**U.S. Cl. 220—23.86** **7 Claims**

1. A combined decanter and tray, the tray comprising a generally flat upper surface and an arcuate substantially centrally disposed orifice having slot means extending outwardly from the arcuate side wall of said central orifice towards the outer side of the tray and the decanter having an outer wall which is substantially arcuate in horizontal cross section, the

lower portion of said side wall being of smaller diameter than the upper portion, outwardly extending substantially horizontal flange means connecting the upper end of the side wall of said lower portion of the decanter and the lower end of the side wall of said upper portion of the decanter, key means projecting outwardly from the periphery of the lower portion of the side wall below said substantially horizontal flange means, said key means being sideable through said slot means when the lower portion of said decanter is inserted through



said substantially centrally disposed orifice of the tray, and a handle for said decanter, whereby upon sliding said key means downwardly through said slot means and rotating said decanter by its handle the upper portion of the key means is located below a portion of the tray which is adjacent to the central orifice and the tray may be lifted by grasping the handle of the decanter permitting transportation of the combined decanter and tray, but upon rotation of said decanter to a position wherein said key means registers with said slot means the decanter may be removed from the tray.

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**3,964,630**

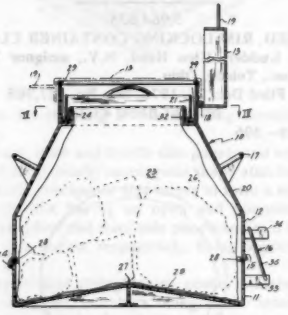
**GARBAGE CAN FOR USE WITH DISPOSABLE BAGS**

**Donald J. Getz, 1741 Sycamore, Hanover Park, Ill. 60103**

**Filed Oct. 16, 1974, Ser. No. 515,147**

**Int. Cl.² B65D *25/16***

**U.S. Cl. 220—63 R** **6 Claims**



**1.** A container for encasing and releasably supporting a disposable garbage bag in position to be filled through a reduced size open top that is easily tied closed and accommodating expansion of the bag along a gradually increasing intermediate portion to a full size bottom portion which comprises a rigid body having an upstanding open top peripheral wall with an inturned grooved ledge spaced below the open top, an intermediate section depending from said wall along a diverging path and a separate bottom section depending below the bottom end of the intermediate section, a cover for the open top of the peripheral wall, a hinge swingably mounting said cover on said wall, a handle on the cover to swing the cover from opened to closed positions, an annular locking member fitting in the open top of the bag and in the groove of said ledge depressing the top end of the bag into the groove and suspending the bag from the ledge, said locking member being removeable from the ledge through the open top of the bag when the bag is filled to permit the bag to be tied closed, a second hinge connecting the separate bottom to the bottom of the intermediate section, a locking means opposite said second hinge securing the bottom section in closed position to cover the bottom of the intermediate section, and said locking means being releasable to permit the intermediate section and peripheral wall to swing free of a filled bag in the container when said annular locking member is removed to thereby expose the bag for easy removal.

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**3,964,631**

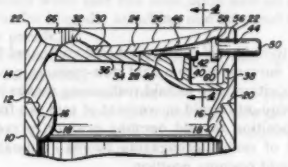
**DRINKING RECEPTACLE**

**Kenneth J. Albert, 7212 Sunset Blvd., Hollywood, Calif. 90046**

**Filed June 24, 1974, Ser. No. 482,363**

**Int. Cl.² A47G *19/22***

**U.S. Cl. 220—90.4** **4 Claims**



**1.** A drinking receptacle provided with a generally cup like body having a normally upper open end; a cover for said body removably and sealingly secured to said upper open end of said cup like body; said cover having a peripheral drinking rim and a top plate portion surrounded by said rim; said top plate portion having upper and lower sides; said top plate portion having a drinking opening therein; said drinking opening being at a first location near the proximity of said rim; an openable valve disposed and adapted to close and open said drinking opening; a finger engageable valve actuator movably mounted on said cover at a second location near the proximity of said rim; said valve actuator disposed engageably to operate said valve for opening and closing the same; said valve having a poppet head disposed at said lower side of said top plate portion adapted to open and close said opening; a resilient arm means coupled to said cover and carrying said poppet head; said resilient arm means disposed adjacent said lower side of said top plate portion and tending to hold said poppet head in closed position relative to said drinking opening; said cover having a peripheral side provided with a valve actuator bearing opening therein; said actuator reciprocally mounted in said bearing opening; said valve actuator having a finger engaging portion projecting radially outward beyond said peripheral side of said cover; said valve actuator having an inwardly directed valve actuating portion disposed below said top plate of said cover; said inwardly directed valve actuating portion engageable with said resilient arm of said valve and disposed to deflect said resilient arm in a direction away from said lower side of said top plate to thereby open said poppet head of said valve relative to said drinking opening.

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**3,964,632**

**CLOSURE WITH A SLOTTED PULL TAB**

**John S. Bozek, Chicago, Ill., assignor to Continental Can Company, Inc., New York, N.Y.**

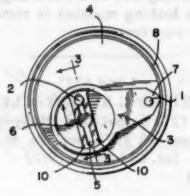
**Filed Sept. 16, 1974, Ser. No. 506,064**

**Int. Cl.² B65D *41/32***

**U.S. Cl. 220—270** **10 Claims**

**1.** An improved safety closure for use on a can or similar container comprising an end panel having an opening flap therein, a tab movably attached to said end panel for move-

ment in a plane generally parallel to said end panel from a non-opening position to an opening position and having means for opening said flap, said tab in the opening position being operative to open said flap, and means for restraining said tab from movement to said opening position from said non-opening position, said restraining means comprising interengaging means on said end panel and on said tab and formed and



arranged to hold said tab against said end panel for the entire extent of movement from said non-opening position to said opening position, one of said restraining means being distortable consequent to said movement of said tab from said non-opening position to said opening position preventing disengagement of said interengaging means until said tab is disposed in said opening position.

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**3,964,633**

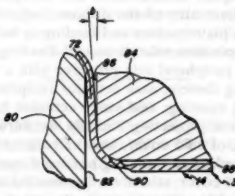
**FULL OPEN END**

**Arthur P. Zundel, Cary, Ill., assignor to National Can Corporation, Chicago, Ill.**

**Division of Ser. No. 325,361, Jan. 22, 1973, Pat. No. 3,875,884, and a continuation-in-part of Ser. No. 195,095, Nov. 3, 1971, Pat. No. 3,712,503. This application Dec. 12, 1974, Ser. No. 531,861**

**Int. Cl.² B65D *41/32***

**U.S. Cl. 220—273** **12 Claims**



**1.** An easy open container end, comprising a panel having a frangible connection of reduced cross-section dividing said panel into a removable section and a permanent section adapted to be connected to a container body, said frangible connection having two opposed concave surfaces producing an area of constantly reducing cross-section between said removable section and said permanent section, and a bead deformed from the panel in the removable section, said bead circumscribing substantially the entire periphery of said removable section and being located a substantially constant dimension from said frangible connection, said bead having pairs of interrupted portions to allow said section to be bent during removal.

**3,964,634**

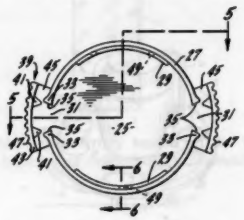
**CHILD RESISTANT SAFETY CAP**

**Andrew S. Jasinski, Grayslake, and Robert A. McKirnan, Winnetka, both of Ill., assignors to Knight Engineering and Molding Co., Arlington Heights, Ill.**

**Filed Sept. 2, 1975, Ser. No. 609,224**

**Int. Cl.² B65D *43/04***

**U.S. Cl. 220—281** **14 Claims**



**1.** A child resistant safety cover for a cylindrical container having a generally annular undersurface located adjacent the top thereof,

said safety cover being formed of a resilient and flexible plastic and including:

a circular top wall,

a tubular wall depending from said circular top wall,

at least one locking flange projecting inwardly from the lower edge of said tubular wall and positioned to engage said undersurface of said container when said cover is positioned on the container,

at least one slit formed in said tubular wall and extending through said lower edge of said tubular wall to allow distortion and movement of said locking flange, and

wedging means carried by said cover and located adjacent to and outwardly of said slit,

said wedging means being resiliently movable into said slit to engage and distort said tubular wall and thereby move said locking flange away from engagement with said undersurface of said container.

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**3,964,635**

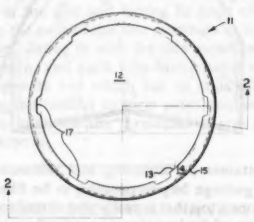
**RECESSED, RIM-LOCKING CONTAINER CLOSURE**

**Rodney E. Ludder, Glen Head, N.Y., assignor to Owens-Illinois, Inc., Toledo, Ohio**

**Filed Dec. 26, 1973, Ser. No. 427,985**

**Int. Cl.² B65D *43/10***

**U.S. Cl. 220—306** **5 Claims**



**1.** A closure adapted to be affixed to the mouth of a container of the type having laterally outwardly projecting means disposed in an annular pattern surrounding said mouth, said closure being integrally formed by thermoforming from sheet-like thermoplastic material in a female mold and comprising in combination: a laterally extending central panel; an axially extending peripheral wall attached to, surrounding and extending upwardly from said central panel; an annular member attached to said peripheral wall at a location above the juncture of said peripheral wall and said central panel, said annular member extending laterally outwardly from said peripheral

wall; and a peripheral skirt attached to said annular member at a location laterally outwardly of the juncture of said annular wall and said peripheral wall, said peripheral skirt extending axially downwardly, said skirt being provided with laterally inwardly projecting means which are adapted to securely engage the outwardly projecting means surrounding the mouth of the container to retain the closure in place with respect to the container to which it is adapted to be affixed, said peripheral wall being provided with a circumferentially spaced apart series of lugs which project radially outwardly thereform toward said peripheral skirt and which terminate short of said peripheral skirt, said peripheral skirt being attached to the annular member at a location spaced outwardly of the juncture of the annular member and the peripheral wall by a distance which is not substantially less than the axial depth of the peripheral skirt.

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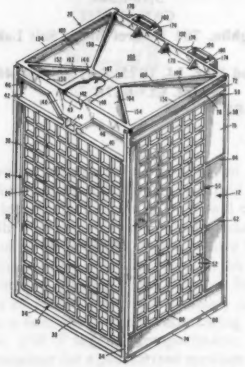
**3,964,636**

## BOX FOR ENCASING A BAG CONTAINING LIQUID

**Houston Rehrig, 4010 E. 26 St., Los Angeles, Calif. 90023**

**Filed Feb. 27, 1974, Ser. No. 446,477**
**Int. Cl.² B65D *25/34, 21/02***
**U.S. Cl. 220—306** **18 Claims**



1. A box for encasing a thin film bag containing liquid comprising:

first, second, third and fourth side panels and an end panel each of substantially rectangular shape attached together along their contiguous side edges to form a substantially quadratic box having an open and opposite said end panel, said first and third side panels and said second and fourth side panels, respectively, being opposite one another,

a plurality of first strengthening corner members, one of said first corner members being at the intersection of each adjacent pair of said side panels,

a plurality of second strengthening corner members, one of said second corner members being located at the intersection of said end panel with each of said side panels, said first and second corner members being integrally joined together,

said first side panel being substantially entirely of first open lattice construction of sufficient strength to support the weight of said bag and the contents thereof when said box rests upon said first side panel,

said third side panel being substantially of open lattice construction,

said second and fourth side panels each comprising a first portion adjacent to said first side panel and extending along the entire distance between said end panel and said open end, said first portion being of solid construction of sufficient strength to withstand the pressure of said bag and the contents thereof when said box rests upon said first side panel, and a second portion of open lattice construction adjacent to said third side panel and extending along a major portion of the distance between said end panel and said open end,

said end panel comprising a first end panel portion adjacent to said first side panel and extending along substantially the entire length of said end panel, said first end panel portion being of solid construction of sufficient strength to withstand the pressure of said bag and the contents thereof when said box rests upon said first side panel, and a second end panel portion substantially entirely of open lattice construction adjacent to said third side panel,

said open lattice of said first side panel being of heavier construction than said open lattice of said second, fourth and end panels,

a lid panel hingedly attached to one of said side panels at said open end and movable between an open position and a closed position, said lid panel being of sufficient strength to support the weight of said bag and the contents thereof when said box rests upon said lid panel,

hinge means for hingedly attaching said lid panel to one of said side panels,

fastening means for releasably fastening said lip panel in said closed position,

first support means on said first side panel to support said box when said box rests upon said first side panel, and

second support means on said lid panel to support said box when said box rests upon said lid panel.

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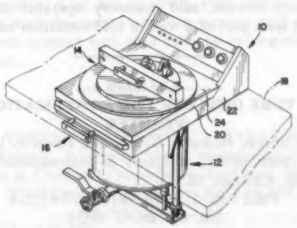
**3,964,637**

## DEEP FRYER RECEPTACLE COVER AND OPERATING MECHANISM THEREFOR

**Clem J. Luebke, Beloit, Wis.; Norman L. Beck, Rockton, and Lowell W. Daniels, Rockford, both of Ill., assignors to The Broaster Co., Rockton, Ill.**

**Filed Sept. 11, 1975, Ser. No. 612,272**
**Int. Cl.² B65D *45/28***
**U.S. Cl. 220—314** **22 Claims**



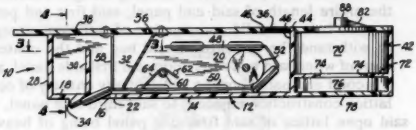
1. Cooking apparatus comprising, cooking vessel means having an opening thereinto, frame means supporting said cooking vessel means, a cover for said opening extending transverse to the axis of said opening, cover support means supporting said cover for reciprocating movement relative to said frame means and cooking vessel means and axially of said opening between open and closed positions with respect thereto, means biasing said cover to move toward said open position, and means for interengaging said frame means and said cover support means to releaseably hold said cover in said closed position.

3,964,638

## DISPENSER FOR BODIES IN SEALED SHEET MATERIAL COMPARTMENTS

Frank S. Dimauro, 4829 Atlantic Ave., Ventnor, N.J. 08406

Filed Dec. 19, 1974, Ser. No. 534,657
Int. Cl.² G07F 11/68; B65G 29/00
U.S. Cl. 221—3 15 Claims



1. In a device for dispensing, one by one, a series of bodies arranged in a row within sealed compartments of an elongated sheet material which must be severed between said compartments for individually releasing the bodies in their sealed compartments, container means for housing a strip of the sheet material and the bodies carried thereby in sealed compartments thereof, said container means having a wall formed with a discharge opening, manually operable means carried by said container means opposite said wall thereof for reciprocating movement by the operator from a rest position first in a forward direction away from said rest position and then in a rearward direction back to said rest position, and means connected at least in part to said manually operable means for responding to said forward movement thereof for feeding the strip of sheet material in a direction which will advance a body in a compartment of the sheet material out through said discharge opening and for cutting across the sheet material between the compartment thereof housing the latter body and the compartment thereof housing the next body so that the body which is fed through said discharge opening will be severed to drop from said container means, said manually operable means cooperating with at least the part of said feeding and cutting means which is connected thereto for retracting the latter part of said feeding and cutting means with said manually operable means when said manually operable means is returned to its rest position and for placing at least said part of said feeding and cutting means in readiness for feeding the next body to said discharge opening when the manually operable means is again moved forwardly from said rest position thereof, said manually operable means itself forming at least part of a wall of said container means.

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3,964,639

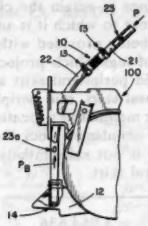
## SEED TUBE DIFFUSER FOR A PNEUMATIC SEED PLANTER

A. Lowell Norris, Downers Grove, and Darlo E. Llenemann, Darien, both of Ill., assignors to International Harvester Company, Chicago, Ill.

Filed Feb. 5, 1975, Ser. No. 547,314
Int. Cl.² B65G 53/58
U.S. Cl. 221—278 8 Claims

1. An air diffuser for use in a pressurized seed delivery tube of a pneumatic type of seed planter having the seed delivery tube connected to a ground furrow opener, the seed delivery tube being cut at a determinant length from the furrow opener and the air diffuser being spliced into the parted ends of the tube and secured thereto; the air diffuser comprising a short cylindrical duct member having a plurality of spaced-apart holes therethrough within a determined axial span, the effective open area of the holes being approximately 50% greater than an open area inside the duct member taken on a cross-section of the duct member within the span of holes; and

wherein the duct member has an air-seed inlet end and an air-seed outlet end, the inlet end having an annular internal stepped portion forming a shoulder before the span of holes, and the outlet end having a venturi portion extending axially after the span of holes and forming a second shoulder, the parted ends of the tube being inserted into the inlet and outlet ends up to the shoulders.



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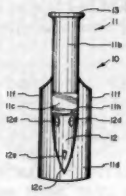
3,964,640

## CAN SPOUT

Loran L. Laughlin, 701 Deseret Bldg., Salt Lake City, Utah 84111

Filed Mar. 14, 1975, Ser. No. 558,465
Int. Cl.² B67B 7/24
U.S. Cl. 222—81 1 Claim



1. A spout for use with cans containing ground coffee and the like, comprising

a body portion formed from a single blank of metal, centrally drawn to have a finger projecting from a flat face of a tongue and a skirt portion, with the ends of said finger being open;

a cutter portion formed from a single blank of metal material of generally triangular configuration, and with shoulders formed at one side thereof, said shoulders being rolled on a line extending from their inner edges towards a point of said blank, holes through the cutter portion between the shoulders and the point, and a pointed projection punched from the cutter portion adjacent the point thereof and extending inwardly of the rolled shoulders; and

a pin extending through the finger and said shoulders when said shoulders are inserted into said finger and said tongue is bent downwardly over the cutter portion, to secure said cutter portion within said body portion with the point of the cutter portion extending downwardly and against the skirt portion of the body portion; and

a portion of the tongue of the body portion extending substantially normal to and away from the cutter portion to serve as a seal extending over a portion of the opening formed by insertion of the spout into the top of a can when the spout is fully inserted into the can.

## 3,964,641
## DEVICE FOR DISPENSING FLOWABLE MATERIALS

Gert Langensiepen, Runderoth, and Werner Bruning, Wallefeld, both of Germany, assignors to Alfred Fischbach KG Kunststoff-Spritzgusswerk, Runderoth, Germany

Filed Oct. 2, 1974, Ser. No. 511,260
Claims priority, application Germany, Oct. 3, 1973, 2349656
Int. Cl.² B67B 7/24
U.S. Cl. 222—82 19 Claims

1. A dispensing receptacle comprising an elongated substantially cylindrical housing having a closed end and a dispensing end longitudinally spaced from said closed end, and provided with a chamber; valve means connected to said dispensing end of said housing and operative for establishing communication between said chamber and the exterior of said housing; a piston mounted in said chamber for displacement longitudinally of said housing and sealingly subdividing said chamber into a first compartment containing the material to be dispensed, and a second compartment; a substantially cylindrical container for a pressurized medium situated in said second compartment and connected to said housing coaxially therewith in the reginon of said closed end thereof, and having a valve formed with an actuating element; and actuating means including an elastically yieldable hollow projection extending centrally and exteriorly of said closed end, said actuating element of said valve of said container extending into said hollow projection and cooperating therewith so as to open said valve when said hollow projection is elastically deformed to thereby release a predetermined quantity of the pressurized medium into said second compartment for displacing said piston toward said valve means with attendant dispensing of said material through the latter.

## 3,964,642
## MINI CADDY

Robert C. Lesh, c/o George Spector, 3615 Woolworth Bldg., 233 Broadway, and George Spector, 3615 Woolworth Bldg., 233 Broadway, both of New York, N.Y. 10007

Filed June 30, 1975, Ser. No. 591,483
Int. Cl.² B47G 19/12
U.S. Cl. 222—142.4 2 Claims

1. In a mini caddy, the combination of a body comprised of two cylindrical cases detachably screwed together at their one ends, each said end having a large refilling opening therethrough, a solid disc between said ends to separate the content of one case from the content of the other, an opposite end of each said case having an end wall a portion of which has perforated openings for dispensing said content, and a rotatable end cap adjacent said case end wall, said end cap partly

covering said case end wall so to selectively expose or close said dispensing perforated openings.

## 3,964,643
## UNPRESSURIZED CONTAINER FOR HOLDING A PLURALITY OF PRODUCTS SEPARATELY AND DISPENSING THEM SIMULTANEOUSLY

Bruno R. Morane, and Jean-Louis H. Gueret, both of Paris, France, assignors to L'Oreal, Paris, France

Filed Dec. 23, 1974, Ser. No. 537,106
Claims priority, application France, Dec. 27, 1973, 73.46537; Dec. 3, 1974, 74.39496
Int. Cl.² B65D 37/00
U.S. Cl. 222—145 19 Claims

1. Unpressurized container for holding at least two products separately and distributing them simultaneously, at least one of said products being a liquid, said container comprising a rigid closed tube and an outer jacket surrounding said tube, said jacket being provided with at least one dispensing orifice and made at least in part of a deformable material, said tube having a section smaller than that of the jacket and a frangible central neck, one of the products to be dispensed being located inside said tube and another of said products inside said outer jacket but outside said tube, said outer jacket being provided with at least one relatively rigid portion positioned to exert a neck-fracturing pressure against said tube when brought into contact with said tube by deformation of said outer jacket.

## 3,964,644
## ADHESIVE DISPENSING APPARATUS

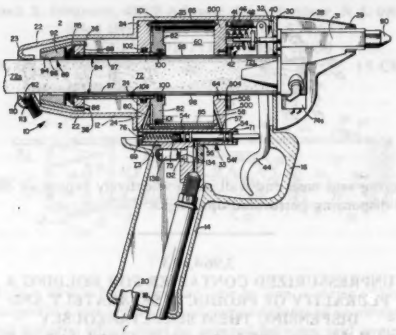
Ray H. Wallace, Rockland, Mass., assignor to Transworld Adhesive & Chemical Corporation, Rockland, Mass.

Filed Sept. 26, 1974, Ser. No. 509,335
Int. Cl.² B67D 5/62
U.S. Cl. 222—146 HE 13 Claims

1. In a hot-melt manually-operated adhesive applicator for receiving a continuous solid rod of hot-melt adhesive material and dispensing said adhesive in melted form, said applicator comprising a central passageway for moving a solid rod of adhesive through said apparatus into a heating zone from which it is dispensed in melt form, the improvement wherein:

a. an annular pneumatic cylinder is arranged around said central passageway, said cylinder comprising an annular piston adapted for reciprocal motion in response to air pressure alternately admitted into and relieved from said cylinder; said piston forming means to actuate an advancement assembly for intermittent engagement and advancement of said adhesive on the forward stroke of said piston;

b. and wherein said pneumatic cylinder comprises, when said piston is retracted, a conduit for conduction of cooling air around said adhesive rod between said heating zone and said retracted piston.



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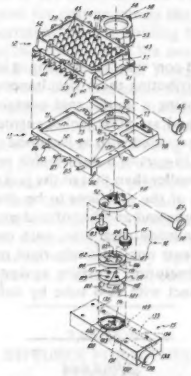
## 3,964,645
## APPARATUS FOR MELTING AND DISPENSING THERMOPLASTIC MATERIAL

Charles H. Scholl, Vermilion, Ohio, assignor to Nordson Corporation, Amherst, Ohio

Filed Feb. 12, 1975, Ser. No. 549,189
Int. Cl.² B67D *5/62*; F27B *14/00*
U.S. Cl. 222—146 HE 23 Claims



1. An apparatus for converting solid thermoplastic material to molten thermoplastic material and for dispensing the molten thermoplastic material comprising,
a grid melter having a continuous side wall, a bottom wall, and an open top for receiving said solid thermoplastic material,
at least one discharge opening in said bottom wall,
a reservoir mounted beneath said grid melter, and adapted to receive molten material from said discharge opening,
means for heating said bottom wall of said grid melter,
a dispenser selectively operable to dispense said molten thermoplastic material,
a pump at least partially mounted within said reservoir for supplying said molten thermoplastic material from said reservoir to said dispenser,
the improvement which comprises,
plurality of rows and columns of heating elements extending upwardly from said bottom wall of said grid melter, each of said heating elements having a base portion and an upper end portion, each of said upper end portions being shaped as a truncated cone, each of said truncated cone shaped portions of each of said heating elements having a bottom of at least twice the cross sectional area as the top and having a substantial taper between said bottom and top.

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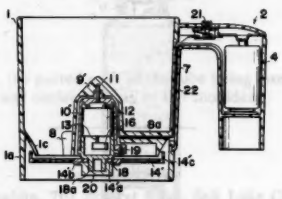
## 3,964,646
## ELECTRIC SIEVE

Toshio Yazawa, and Fumi Yazawa, both of Kawaguchi, Japan, assignors to Toshio Yazawa, Kawaguchi, Japan

Filed Dec. 30, 1974, Ser. No. 537,178
Claims priority, application Japan, Mar. 14, 1974, 49-29642
Int. Cl.² B07B *1/32*
U.S. Cl. 222—189 5 Claims



1. An electric sieve comprising:
a casing adapted to contain fine particles or a powdered substance to be sifted,
a handle portion connected to said casing adapted to be grasped by one hand of an operator, for holding the sieve,
a supporting arm extending from the inner wall of said casing to the center portion thereof,
a motor cover connected to said supporting arm at the center portion of said casing,
an electric motor secured within said motor cover and having an output shaft extending downwardly therefrom,
a weight member eccentrically connected to said output shaft of said motor,
a meshed member disposed within said casing adjacent the lower end portion thereof,
means for mounting said meshed member for vibration by rotation of said output shaft upon actuation of said motor,
means for supplying electric current to said motor for actuation thereof,
inner and outer annular flange members at the lower part of said casing and spaced apart to provide an annular recess therebetween, and
a vertically extending annular flange around the periphery of said meshed member partially received within said annular recess.

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## 3,964,647
## SPRAY DISPENSING DEVICE

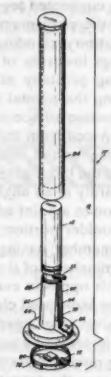
Harry S. Dearing, 25 E. 83rd St., New York, N.Y. 10028

Filed Mar. 11, 1975, Ser. No. 557,320
Int. Cl.² B67D *5/64*
U.S. Cl. 222—174 5 Claims

1. A spray dispensing device for dispensing a spray comprising, in combination,
a container for dispensing a quantity of a desired spray including valve means associated with said container and actuation means to operate said valve means to dispel a spray from said container,
a first housing for said container comprising a substantially frusto-conically shaped segment within which is disposed said container,
said container being disposed within said first housing and said first housing including an access opening therein to

permit the spray when dispelled from said container to clear said housing,

said housing segment including a tapered axially disposed slot therein along the extent of said segment to accommodate the valve housing of said container when said container is inserted therein and said segment being resilient to outwardly expand upon insertion of said container therein to frictionally grip and retain said container therein,



means within said first housing to cooperatively contact the actuation means on said container, and

second housing means cooperatively interrelated with said first housing means and movable from a first position wherein no compressive force is exerted on said container to a second position wherein a compressive force is exerted on said container thereby to exert a force on said container actuation means to dispel a spray from said container.

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**3,964,648**

**TONER SUPPLY DEVICE FOR COPYING APPARATUS**

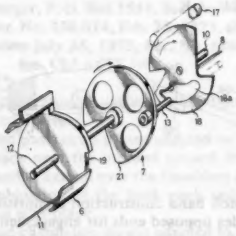
**Shigeru Suzuki, and Minoru Suzuki, both of Yokohama, Japan, assignors to Ricoh Co., Ltd., Japan**

**Filed June 20, 1975, Ser. No. 588,801**

**Claims priority, application Japan, June 28, 1974, 49-73244**

**Int. Cl.² G01F *11/20***

**U.S. Cl. 222—333** **6 Claims**



**1.** In a copying apparatus of a type in which images are fixed on a sheet of copy by magnetically positioning a toner material, the improvement comprising a material container having a cylindrical interior wall with a discharge opening above the bottom of said wall on one side thereof, a rotatable scooping member having a portion extending longitudinally through at least a portion of said container adjacent said interior wall and being rotatable around said container in closely spaced relationship to said wall to pick up material from said container and discharge it through said discharge opening, and drive means connected to said scooping member to rotate said scooping member and including a rotatable drive member having a resilient transmission portion acting on said scooping member to rotate it, and a holding member disposed in the path of movement of said resilient transmission portion and temporarily blocking the movement thereof to bend said resilient member to effect the build up of resilient force therein whereby the resilient member becomes clear of said blocking member to release said resilient force which acts in the direction of rotation of said scooping member to accelerate it at a location where its rotation approaches the discharge opening and to cause the material picked up by the longitudinally extending portion thereof to be hurled through the discharge opening.

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**3,964,649**

**PRESSURIZED DISPENSING CONTAINER**

**David John Alexander, Twickenham, England, assignor to Lever Brothers Company, New York, N.Y.**

**Filed Jan. 30, 1975, Ser. No. 545,290**

**Int. Cl.² B65D *83/14***

**U.S. Cl. 222—399** **5 Claims**

**5.** In a pressurized dispensing device containing a fluid product to be dispensed, the improvement comprising a reservoir containing a liquefied propellant gas selected from the group consisting of liquefied hydrocarbons, liquefied chlorohydrocarbons, liquefied fluorohydrocarbons, the propellant being sorbed by a particulate hydrophobic silica, the reservoir comprising a vapour permeable envelope of fibrous material selected from the group consisting of polypropylene fibres and cellulose fibres, to permit propellant gas to pass through and pressurize the headspace of the device.

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**3,964,650**

**BAG FILLING MACHINE HAVING COMBINED INLET VALVE AND LEVEL CONTROL**

**Erwin M. Lau, Dolton, Ill., assignor to Black Products Co., Chicago, Ill.**

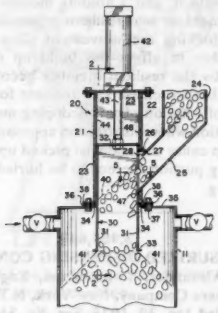
**Filed Oct. 18, 1974, Ser. No. 515,825**

**Int. Cl.² G01F *11/28***

**U.S. Cl. 222—450** **8 Claims**

**1.** A bag filling machine adapted for receiving material from a supply means comprising a chamber, a bag-filling spout connected with the lower part of said chamber, an inlet valve for admitting material from a supply source to said chamber, said inlet valve comprising an outer casing mounted on a top wall of said chamber and communicating therewith, an inner casing slidably mounted for movement within said outer casing between an upper and a lower position, the inner casing being of a length such that its lower edge extends downwardly into said chamber when in said lower position to limit the level of material being fed into said chamber in order to provide a free space in the upper portion of said chamber, said outer and

inner casings each having an opening which are aligned with each other when said inner casing is in said lower position communicating the interior of said inner casing with said supply source, the wall of said inner casing being imperforate beneath the opening therein to provide an upwardly sliding gate operative to close the opening in said outer casing to cut



off the flow of material from said supply source through said opening in said outer casing, the upward movement of said lower edge incident to valve closing permitting the material within said inner casing to drop into said chamber, and means for slidably moving said inner casing between said lower and said upper positions.

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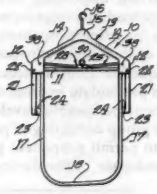
**3,964,651**

## TAMPER-PROOF GARMENT HANGER

**Rose B. Hamilton, 95 Brookfield St., Manchester, Conn. 06040, and Joan R. Yarus, 37 Beals St., Brookline, Mass. 02146**

**Filed Oct. 23, 1974, Ser. No. 517,159**
**Int. Cl.² A47J 51/14**
**U.S. Cl. 223—91** **4 Claims**



1. A tamper-proof garment hanger comprising:

an inverted V-shaped yoke of hollow construction formed of a pair of hollow converging leg members with a top member defined at the converging ends thereof and with shoulder portions defined at the spaced apart ends thereof;

a rigid horizontal cross-member extending in the plane of the yoke and interconnecting the shoulder portions;

a suspension hook having a curved hook portion and a shank extending vertically into the top member, the shank being rotatably affixed to the top member for rotation of the hook relative thereto about its axis;

vertically extending depending side members affixed to each shoulder portion and extending downwardly therefrom parallel to each other;

a pair of elongated rigid clamp arms each associated with one of the shoulder portions and pivotally attached thereto intermediate its ends and spaced outwardly from respective ones of the side members, the clamp arms being pivotably movable in the plane of the side members, the clamp arms each having a top end and a bottom end;

a pad affixed to the bottom end of each of the clamp arms extending outwardly therefrom in the direction of the associated side member;

a pad affixed to each side member in a position thereon to be engaged by an associated pad of the associated clamp arm;

a toggle mechanism consisting of a pair of complemental identical link elements each of a generally L-shaped configuration and having the outer ends of their long leg portions pivotally connected together at a point intermediate the ends of the cross-member, the terminal end of the short leg portion extending vertically downwardly from the long legs inwardly of an associated shoulder portion and being pivotally attached to the shoulder portion for guiding the pivotal movement of the toggle between a first position adjacent the cross-member and a second position spaced from the cross-member;

a connecting member formed integrally with the short leg portion of each of the link elements and extending downwardly and outwardly at an angle thereto from the point of pivot connection to a point adjacent the lower edge of the associated shoulder portion;

a connecting link member having one end pivotally connected to the terminal end of the short leg portion extension and having its opposite end pivotally connected to the top end of the associated clamp arm;

movement of the pivot joint interconnecting the adjacent ends of the link elements to a position adjacent the cross-member effecting pivotal movement of the clamp arms in a direction to engage the terminal ends thereof with the pads of the side members, and movement of the toggle to the second position spaced upwardly and away from the cross-member effecting the outward pivotal movement of the terminal ends of the link members away from the side members, these positions being referred to as the clamping positions and the unclamping positions respectively; and

locking means associated with each of the link elements when in the clamping position to prevent unauthorized movement of the toggle to the unclamping position, the locking means being operable to an unlocking position to permit free movement of the toggle between the clamping and unclamping positions.

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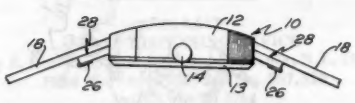
**3,964,652**

## WATCH BAND AND CONNECTOR THEREFOR

**Kenneth Fuld, New York, N.Y., assignor to Kestenman Bros. Mfg. Co., Providence, R.I. and Major Watch Case Co., Inc., Brooklyn, N.Y., part interest to each**

**Filed Jan. 17, 1972, Ser. No. 218,247**
**Int. Cl.² A44C 5/16**
**U.S. Cl. 224—4 E** **10 Claims**



1. A watch band construction comprising a band member that includes opposed ends for engagement with a casing of a wrist watch, at least one lug attached to said casing and extending outwardly therefrom, a connector assembly for joining one end of said band member to said casing including a lock element located on said lug and normally projecting outwardly therefrom prior to connection of said one end of the band member to said casing, a connector member joined to said one end of the band member and being shaped and proportioned for securement to said lug and lock element,

wherein the connector member abuts said casing and locates said one end of said band member in abutting relation with said casing, said lock element being reversely foldable into engagement with said connector member to lock said connector member and said one end of the band member to said lug and watch casing.

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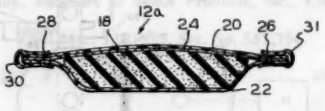
## 3,964,653
## PADDED CARRYING STRAP CONSTRUCTION

**Glenn L. Strutz, Madras, Oreg., assignor to Tote Pak Co., Madras, Oreg.**

**Division of Ser. No. 379,716, July 16, 1973, Pat. No. 3,882,914. This application Sept. 18, 1974, Ser. No. 506,965**
**Int. Cl.² A45C 1/04**
**U.S. Cl. 224—5 P** **12 Claims**




1. A carrying strap construction comprising:
a first thin, soft, pliable strip forming a first surface layer of said strap;
a second thin, soft, pliable strip overlying said first strip and forming a second surface layer of said strap;
a resilient layer of padding material of greater thickness than said surface layers sandwiched between said surface layers;
a thin, flexible strip of high-strength material resistant to stretching forming an inner load-bearing layer of said strap between said padding layer and one of said surface layers and extending across the full width of said padding layer,
said inner load-bearing layer having substantially the same overall width edge-to-edge of said strap as the adjacent said surface layer,
and edge securing means securing together said first and second surface layers and said load-bearing inner layer at the opposite side edge portions of said strap and along the length thereof to bind together said surface and inner layers and enclose said layer of padding, such that said surface and inner layers extend together throughout substantially the full width and length of said strap end securement means attaching said surface layers and said load bearing inner layer to each other at their ends and for attachment to a load carrying means

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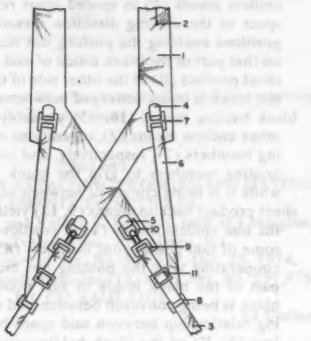
## 3,964,654
## PACK STRAPS

**Donald B. Wittenberger, P. O. Box 1551, Seattle, Wash. 98103**

**Continuation of Ser. No. 336,014, Feb. 26, 1973, abandoned. This application July 25, 1975, Ser. No. 598,760**
**Int. Cl.² A45F 3/08**
**U.S. Cl. 224—8 R** **12 Claims**

1. A pack strap apparatus for use in combination with back packs or the like, comprising:
a. first and second pack strap means adapted to be secured to the back pack near the top and toward the opposite sides thereof and to extend over the shoulders of a wearer when the combination of the back pack and said pack strap apparatus is in place;
b. first and second channeling means adapted to be secured to said back pack in the vicinity of opposite sides of said back pack near the bottom thereof, such that said first and second channeling means tend to extend toward each other in the vicinity of the wearer's waist;
c. first and second connecting strap means, each having first and second ends and secured respectively, at their first ends, to said first and second pack strap means, said first and second connecting strap means extending substantially vertically downwardly from said first and second pack strap means and slidably passing through, respectively, said first and second channeling means, the positions of first and second channeling means, respectively, relative to said first and second connecting strap means defining first and second sections thereof, wherein said first section of each connecting strap extends from said first end thereof to the point there along where each connecting strap passes through its associated channeling means and wherein said second section of each connecting strap extends for the remainder thereof, the lengths of said first and second sections of each connecting strap means varying with movement of the wearer, said first and second connecting strap means extending across the wearer's chest at an angle such that said first and second connecting strap means cross each other in the vicinity of the middle of the wearer's chest; and




d. first securing means securing said second end of said first connecting strap means to said second pack strap means, and second securing means securing said second end of said second connecting strap means to said first pack strap means such that said first and second pack strap means and said first and second channeling means tend to be drawn toward each other in response to movement of the wearer, thus maintaining the back pack in place on the wearer's back and tending to prevent movement of the back pack during movement of the wearer.

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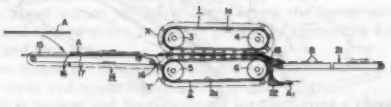
## 3,964,655
## APPARATUS FOR CONTINUOUS PUSHING OUT OF SHEET PRODUCT FROM BLANK

**Matumoto Kotaro, Osaka, Japan, assignor to Dai Nippon Insatsu Kabushiki Kaisha, Tokyo, Japan**

**Filed Sept. 25, 1975, Ser. No. 616,562**
**Int. Cl.² B26F 3/02**
**U.S. Cl. 225—97** **10 Claims**



1. Apparatus for continuous pushing out of at least one sheet product from a blank comprising at least one sheet formed in advance with cut lines corresponding to the contour of the sheet product, said apparatus comprising:

a pair of endless moving means (1, 2) having respective spans thereof disposed in opposed relationship and driven in the same direction from one end thereof to the other end, said spans being arranged in mutually converging relationship with respect to said direction;

means (14) for supplying the blank (A) between said spans at the one ends thereof so as to be conveyed along the spans;

blank holding members (7) secured to one of said endless means (1) in spaced apart relationship with respect to the moving direction thereof and disposed at positions enabling the holding members (7) to abut on that part of the blank (A) outside of said contour (C) of the sheet product at one side of the blank while the blank is being conveyed between said spans;

sheet product pushing out members (8) secured to the other endless means (2) in spaced apart relationship with respect to the moving direction thereof and disposed at positions enabling the pushing out members (8) to abut on that part of the blank inside of said contour (C) of the sheet product (B) at the other side of the blank (A) while the blank is being conveyed between said spans;

blank backup means (10, 13) yieldably supported on the other endless means (2) at positions opposing said holding members (7), respectively, and cooperating with the holding members to grip the blank (A) therebetween while it is being conveyed between said spans; and

sheet product backup means (9, 12) yieldably supported on the one endless means (1) at positions opposing at least some of said pushing out members (8), respectively, and cooperating with the pushing out members to grip the part of the blank inside of said contour (C) while the blank is being conveyed between said spans, the converging relationship between said spans being such that the loci (X, Y) of the blank holding members (7) and the sheet product pushing out members (8) are spaced apart in the region of said one end of the spans and partially overlap each other in the region of said other end, whereby the part (B) of the blank inside of said contour (C) is gradually pushed out from the remaining part ($A_1$) of the blank transversely to said direction with resultant yielding of said blank backup means (10, 13) and said sheet product backup means (9, 12) while the blank is conveyed between the spans.

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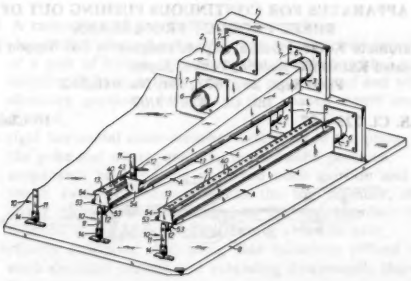
**3,964,656**

## AIR BAR ASSEMBLY FOR WEB HANDLING APPARATUS

**Terry A. Hella, Appleton, Wis., assignor to TEC Systems, Inc., DePere, Wis.**

**Filed Apr. 14, 1975, Ser. No. 567,685**
**Int. Cl.² B65H** *17/32*
**U.S. Cl. 226—97** **14 Claims**



1. An air bar assembly for web handling apparatus comprising an air supply header having an elongated discharge opening along one side thereof, guide track means on said header and arranged along opposite sides of said opening, an air bar including an air discharge nozzle arranged longitudinally thereof, said air bar having means for being slideably engaged in said header track means whereby said air bar can be slideably removed in a longitudinal direction from said header.

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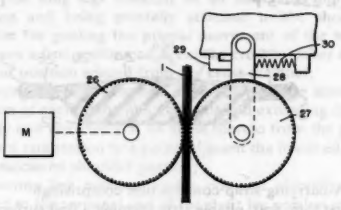
**3,964,657**

## YARN TRANSPORTING APPARATUS

**Erich Lenk; Karl Bauer, and Herbert Turk, all of Remscheid, Germany, assignors to Barmag Barmer Maschinenfabrik Aktiengesellschaft, Wuppertal, Germany**

**Filed July 3, 1974, Ser. No. 485,614**
**Claims priority, application Germany, July 4, 1973, 2365328, May 4, 1974, 2422563**
**Int. Cl.² B65H** *17/22*
**U.S. Cl. 226—177** **6 Claims**




1. In a high speed yarn transporting apparatus having two transporting nip rolls mounted rotatably at adjustably positioned intervals between their axes of rotation to exert a clamping or gripping effect on the yarn running therebetween, the improvement which comprises:

yarn contacting circumferential surfaces on each of said rolls which contain a plurality of grooves distributed thereover;

means to drive each of said nip rolls at about the same speed of rotation with respect to each other when gripping said yarn therebetween;

means to resiliently urge one nip roll toward the other in yarn contacting relationship; and

stop means to maintain a gap space between the yarn contacting circumferential surfaces of said nip rolls.

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**3,964,658**

## ROLLER REPLACING

**Edwin L. Edwards, 24 York Terrace, Brookline, Mass. 02146**

**Filed Sept. 4, 1974, Ser. No. 503,115**
**Int. Cl.² B65H** *17/20*
**U.S. Cl. 226—190** **6 Claims**

1. Web drawing roller assembly for drawing plastic film comprising,

means defining an elongated central shaft support for carrying roll segments,

means defining a plurality of flexible surfaced roll segments arranged in longitudinal array along nearly the entire length of the shaft for bearing against a plastic film web to be guided with a gap between each pair of adjacent segments that is less than the actual length of each segment,

means for detachably securing each of said roll segments to said central shaft whereby any of said roll segments may be replaced when worn,

each roll segment including means defining a central stiffening core of annular form fitting over said shaft support,

said means for detachably securing comprising means for keying together the central stiffening cores and said shaft support to prevent relative rotation therebetween while

allowing longitudinal sliding therebetween for assembly and disassembly of the roll segments with the shaft,

and means for separating axially adjacent roll segments to establish the gaps between each pair of adjacent segments,

each of said roll segments comprising multiple flexible surfaced portions separated by notched depressions in the segment.

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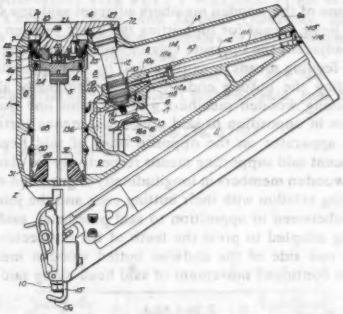
**3,964,659**

**SAFETY FIRING CONTROL MEANS FOR A FLUID OPERATED TOOL**

**Frank J. Eiben; Eric H. Halbert, both of Cincinnati; William T. Jobe, Bethel, all of Ohio, and Carl Siegmann, Bremen, Germany, assignors to Senco Products, Inc., Cincinnati, Ohio**

**Filed Mar. 12, 1975, Ser. No. 557,756**
**Int. Cl.² B25C *1/04***
**U.S. Cl. 227—8** **29 Claims**



1. In a pneumatically actuated fastener applying tool with a fastener containing magazine, the tool being of the type having firing control means comprising two separate and independent triggering means shiftable independently and in any order between normal and firing positions and required to be concurrently in their firing positions to actuate said tool, the improvement comprising safety means providing a time limit within which both of said triggering means must achieve their firing positions to fire said tool.

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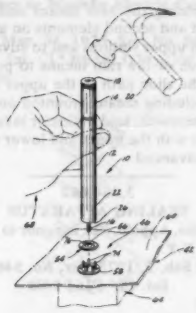
**3,964,660**

**SNAP ATTACHING TOOL**

**Donald W. Hensley, 1822 Park Ave., Alton, Ill. 62002**

**Filed Mar. 13, 1975, Ser. No. 557,943**
**Int. Cl.² A41H *37/04***
**U.S. Cl. 227—15** **9 Claims**

1. A snap attaching tool comprising a barrel having a pin resiliently biased to extend from a first end and a second end adapted to receive a driving force, said pin adapted to be received in a socket of a female snap member and said barrel



having a central bore with a recess at the first end for receiving the stud of the male snap member.

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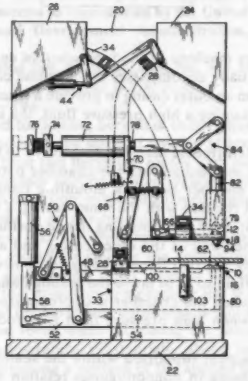
**3,964,661**

**APPARATUS FOR ATTACHING PRONGED AND MATING ELEMENTS TO ARTICLES**

**Erich A. Schmidt, and Volker E. Schmidt, both of Lexington, Ky., assignors to Textron, Inc., Providence, R.I.**

**Continuation-in-part of Ser. No. 509,629, Oct. 23, 1974, abandoned. This application July 18, 1975, Ser. No. 597,076**
**Int. Cl.² A41H *37/10***
**U.S. Cl. 227—18** **12 Claims**



1. An apparatus for attaching first and second mating elements to articles wherein one of the first and second elements has a deformable prong extending therefrom for securing the one element through the article to the other of the first and second elements, said apparatus comprising

a lower station for supporting a first element,

an upper station vertically aligned with the lower station and spaced above the lower station for supporting a second element,

ram means for forcing the first and second elements at the lower and upper stations toward each other,

a first hopper and feeding means for containing a plurality of first elements and for feeding first elements sequentially to the lower station,

means forming a slide path extending horizontally to the upper station,

a second hopper and feeding means for containing a plurality of second elements and for feeding second elements

sequentially to a point in the slide path spaced from the upper station,

a slide bar mounted for sliding movement in the slide path,

means for operating the ram means and the slide bar to assemble first and second elements on an article between the lower and upper stations and to advance the slide bar after operation of the ram means to push a second element down the slide path to the upper station, and

an indicator including means mounted on the slide bar for movement therewith, said indicator means being in vertical alignment with the upper and lower stations when the slide bar is advanced.

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**3,964,662**

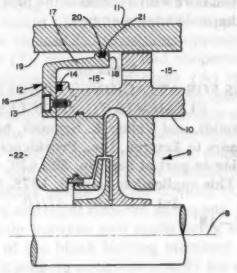
## SEALING APPARATUS

**Donald P. Ravicchio, Appolo, Pa., assignor to Carrier Corporation, Syracuse, N.Y.**

**Filed Feb. 3, 1975, Ser. No. 546,576**

**Int. Cl.² F16J 9/00**

**U.S. Cl. 277—58** **5 Claims**



1. In a rotary machine of the type wherein an inner casing, which substantially encompasses the machine components, is mounted within an outer casing to provide a chamber therebetween for containing a high pressure fluid, the improvements comprising

a pressure deformable member responsive to the high pressure fluid introduced into the chamber between the casings, the member having a mounting flange secured in fluid-tight relation with the inner casing, a sealing flange dependent upon the mounting flange positioned adjacent to the inner wall of the outer casing and a resilient arm connecting the two flanges being responsive to the high pressure fluid so as to move the sealing flange from a first position when the chamber is unpressurized to a second position when high pressure fluid is introduced therein, and

a sealing element supported within the sealing flange, said element being in noncontiguous relation with the inner wall of the outer casing when the flange is supported in said first position and seated in positive sealing contact against the inner wall of the outer casing when the flange is supported in said second position.

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**3,964,663**

## APPARATUS FOR FORMING WOODEN JOINTS

**John Calvin Jureit, Coral Gables; Roy Leutwyler, Miami; Larry Brodsky, Sunrise; Benjamin Kushner, Miami; Andrew G. Selpos, Miami, and Adolfo Castillo, Miami, all of Fla., assignors to Automated Building Components, Inc., Miami, Fla.**

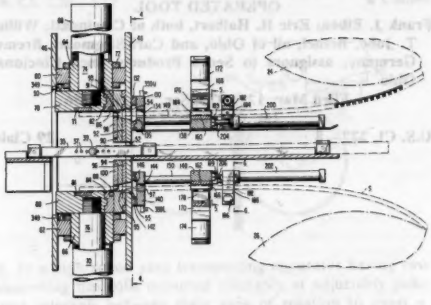
**Filed Sept. 26, 1974, Ser. No. 509,567**

**Int. Cl.² B27F 7/02**

**U.S. Cl. 227—95** **19 Claims**

1. Apparatus for cutting elongated sheet metal connector stock of the type having a plurality of teeth struck integrally therefrom to form a discrete connector plate and embedding the teeth of the connector plate into a pair of adjoining elongated wooden members disposed in longitudinally aligned end-to-end butting relation comprising:

a support sturcture, a presshead carried by said support structure for movement along a predetermined path, means for moving said presshead along said predetermined path, means carried by said support structure for feeding the connector stock into the path of movement of said head and from one side thereof, cooperable means carried by said support structure and said presshead including a cutting edge for cutting the stock as said presshead moves along said path thereby to form a connector plate of predetermined length, means for supporting one of the wooden members adjacent said one side of said head, means for supporting the other wooden member adjacent the opposite side of said head remote from said feeding means, means carried by said apparatus for locating the butting ends of the longitudinally aligned adjoining wooden members and the joint line therebetween in opposition to said presshead, means carried by said apparatus on the opposite sides of said head and adjacent said supporting means respectively for clamping the wooden members in longitudinally aligned end-to-end butting relation with their butting ends and the joint line therebetween in opposition to said presshead, said head being adapted to press the teeth of the connector plate into one side of the endwise butted wooden members upon continued movement of said head along said path.



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**3,964,664**

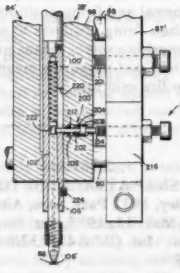
## BEAM LEADED DEVICE WELDING MACHINE

**Steven J. Butler, Frankfort; Arthur Harley Clawson, Jr., and Robert Jackie Ward, both of Attica, all of Ind., assignors to P. R. Mallory & Co., Inc., Indianapolis, Ind.**

**Continuation-in-part of Ser. No. 450,563, March 13, 1974, Pat. No. 3,920,949. This application Aug. 20, 1975, Ser. No. 605,990**

**Int. Cl.² B23K 31/00**

**U.S. Cl. 228—6 A** **3 Claims**



1. Apparatus for attaching elements to a substrate comprising:

a. a first heated platform receiving base members each having a multiplicity of said elements thereon,
b. means indexing said first platform in two directions substantially normal to each other,
c. a second heating platform receiving said substrate,
d. transfer means transferring at least one element from said first heated platform to said second heated platform comprising:
1. a sleeve,
2. a tool holder movable within said sleeve,
3. a heating rod carried by said holder,
4. a bore extending through a central axis of said heating rod,
5. a spring biased sleeve slideably carried in said bore,
6. means applying a vacuum pressure to said bore and said spring biased sleeve,
7. holding means carried by said first named sleeve and engaging said spring biased sleeve to maintain same in a predetermined position, and
8. an adjustable stop means carried by a frame holding said transfer means engaging said holding means, and
e. adjusting means carried by said second heated platform for adjusting the position of said element in relation to said heating rod means so as to enable substantially equal pressure to be applied to said element.

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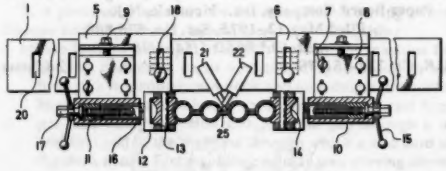
3,964,665

## ADDITIONAL DEVICE FOR AN AUTOMATIC WELDING EQUIPMENT FOR FULLY WELDED TUBE WALLS

Juraj Cervenka, Brno, and Jaroslav Olesovsky, Ricmanice, both of Czechoslovakia, assignors to Prvni Brnenska strojirna, Brno, Czechoslovakia

Filed June 10, 1974, Ser. No. 477,768
Claims priority, application Czechoslovakia, June 11, 1973, 4177-73
Int. Cl.² B23K 37/04
U.S. Cl. 228—44.1 R 2 Claims




1. A device for automatic welding equipment for fully welded tube walls joined by a strip comprising a first and second pair of draw rolls, a cross member provided with a guide, two welding heads placed between the first pair and the second pair of draw rolls wherein into the space between the said first pair and the said second pair of draw rolls the cross member is fixed to the frame of the automatic equipment, profile rollers pushing the tubes into the strip, bodies, screws in said bodies for selectively affixing said bodies to said guide in a plurality of vertical positions, a hub on the bottom of each of said bodies, a horizontally displaceable sleeve in each of said hubs, a fork on an end of each of said sleeves, and a pin in each of said forks, said profile rollers being pivotably mounted in said pins, said bodies, screws, hubs, sleeves, forks and pins constituting adjustable supports on the guide of said cross member.

3,964,666

## BONDING CONTACT MEMBERS TO CIRCUIT BOARDS

Donald Dinella, Union, and Richard M. Kovaric, Verona, both of N.J., assignors to Western Electric Company, Inc., New York, N.Y.

Filed Mar. 31, 1975, Ser. No. 564,007
Int. Cl.² H05K 3/24, 1/06
U.S. Cl. 228—106 7 Claims

1. A method of bonding a contact member to a conductor, which comprises:
positioning a solar-coated surface member against an exposed surface of the conductor;
placing a resilient sheet adjacent the contact member;
applying pressure through the sheet against the member to urge the member into contact with the conductor; and
maintaining such pressure while liquefying and resolidifying the solder to bond the member to the conductor.

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3,964,667

## DIFFUSION BONDING

Robert C. Anderson, Oak Ridge, Tenn., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Jan. 19, 1966, Ser. No. 521,747
Int. Cl.² B23K 31/02
U.S. Cl. 228—194 10 Claims

1. A method for joining beryllium to beryllium by diffusion bonding, comprising the steps of coating at least one surface portion of at least two beryllium pieces with nickel, positioning a coated surface portion in a contiguous relationship with an other surface portion, subjecting the contiguously disposed surface portions to an environment having an atmosphere at a pressure lower than ambient pressure, applying a force upon the beryllium pieces for causing the contiguous surface portions to abut against each other, heating the contiguous surface portions to a maximum temperature less than the melting temperature of the beryllium, substantially uniformly decreasing the applied force while increasing the temperature after attaining a temperature substantially above room temperature, and maintaining a portion of the applied force at a temperature corresponding to about maximum temperature for a duration sufficient to effect the diffusion bond between the contiguous surface portions.

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3,964,668

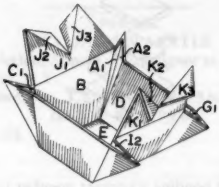
## SIMPLE FOLDABLE CONTAINER FOR FOOD AND BEVERAGES

Tenhon Lin, No. 53, Tai Ping Road, Hsin Tien, Taipei Hsien, China /Taiwan

Filed Sept. 23, 1975, Ser. No. 615,938
Int. Cl.² B65D 5/26
U.S. Cl. 229—35 1 Claim

1. A simple foldable container for foods and beverages characterized in that said container is formed from a blank made of a paper sheet of suitable hardness which is in the shape of a generally rectangular 16 sided polygon having roll-pressed thereon a plurality of inwardly and outwardly folding lines dividing the surface of the blank into one square

six trapezoids and eight triangles, said square being centrally located to serve as the base for the assembled container and adjacent symetrical trapezoids to serve as side walls, said symetrical trapezoids having pairs of symetrical triangles adjacent to the corners thereof to serve as holding members, one pair of oppositely located trapezoids having extending therefrom symetrical trapezoids to serve as locking panels having a slot cut at the central portion of the outer edge thereof, said slot being in the shape of a straight line, a triangle or a trapezoid, said locking panel also having roll-pressed thereon between the apex of the slot and the outside corners of the said




trapezoid folding lines dividing both sides of said trapezoid into two symetrical triangles with said folding lines as the base thereof; first said symetrical trapezoids being inwardly folded around said inwardly folding lines to form wall panels, above said corner triangles being inwardly folded around said inwardly folding lines toward the side walls connected to said locking panels, above said locking panels being outwardly folded along outwardly folding lines, the said triangular portions thereof being inserted into the space between said triangular corner holding members and said side wall of locking panel to form a non-leaking container with the opening being larger than the base.

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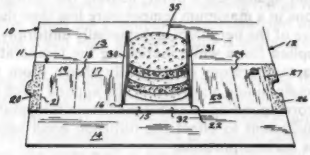
**3,964,669**

## COMPOSITE WRAPPER COMBINING RIGID AND FLEXIBLE ELEMENTS

**Glenn R. Sontag, Oconomowoc, and Benjamin M. Tranholm, Milwaukee, both of Wis., assignors to Milprint, Inc., Milwaukee, Wis.**

**Filed Sept. 2, 1975, Ser. No. 609,253**
**Int. Cl.² B65D 5/08**
**U.S. Cl. 229—40** **6 Claims**




1. A composite wrapper comprising, in combination:
a rigid foldable member joined to a flexible packaging film member,
the rigid foldable member including a base panel having a pair of opposed edges and liftable flaps that are foldable to an upright position relative to the flexible member,
the rigid foldable member also including wall panels connected to said opposed edges of the base panel and foldable to an upright condition to enclose an article carried between the liftable flaps when upright to form a sleeve about such article, and
the flexible member having marginal portions extending beyond either side of the rigid member that are foldable to close each end of the sleeve formed upon folding of the rigid member and thereby complete the package enclosure.

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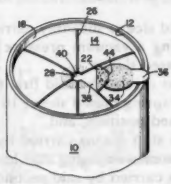
**3,964,670**

## CLOSURE

**John Sigfrid Amneus, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Dec. 9, 1974, Ser. No. 530,590**
**Int. Cl.² B65D 5/54**
**U.S. Cl. 229—51 ST** **24 Claims**




1. Manually openable captive container closure comprising, in combination, a cover portion of a manually tearable sheet material with high deadfold characteristics having an integral margin portion extending peripherally therearound together with means for enabling said margin portion to be attached contiguously around the mouth of a container to extend said cover portion sealingly across such container mouth, means for enabling manual opening of a perforation through a generally central region of said cover portion and means for directing manual tearing of said cover portion outwardly along a plurality of tear lines radiating from said perforation to said margin portion to separate said cover portion into a plurality of captive segments attached to said margin portion so that bunching of said segments against said margin portion provides a generally open and unobstructed fenestration substantially contermineous the container mouth.

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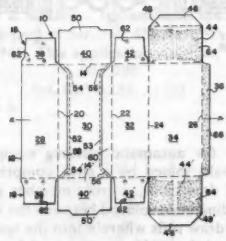
**3,964,671**

## CARTON FOR A PACKAGE CONVERTIBLE TO A BAKING PAN

**Thomas C. Steel, Oak Brook Terrace, Ill., assignor to Federal Paper Board Company, Inc., Montvale, N.J.**

**Filed May 12, 1975, Ser. No. 576,888**
**Int. Cl.² B65D 5/54, 5/48**
**U.S. Cl. 229—51 TS** **2 Claims**




1. A carton for packaging a product, said carton being initially formed as a tube comprising top, bottom and connecting side wall panels, each with oppositely disposed end edges, end closure panels hingedly connected to said top, bottom and side wall panel end edges, which end closure panels are foldable to closed position so as to form an end wall structure, the end closure panels which are connected to said top side wall panel being secured in overlying relation to end closure panels which are connected to adjoining side wall panels and being secured to the underlying panels by means which enables at

least a middle portion thereof to be readily torn loose without destroying the end wall structure, and said top wall forming panel having laterally spaced tear line formations which are disposed in spaced, parallel relation to the side edges of the top wall forming panel and which extend between the associated end wall panels, whereby the outermost end wall panels and a major portion of the top wall forming panel may be torn loose and discarded so as to convert the carton to an open top tray structure having narrow flange formations hinged to the top edges of the side walls which serve to reinforce the top edges of the side wall panels, and said end wall forming closure panels which are hingedly connected to said bottom wall panel having tuck flaps on the margin opposite their hinged connection with said bottom wall panel which serve as top edge flanges and reinforce the top edges of the end wall panels when said major portion of said top wall forming panel is torn loose and pulled free of said top wall forming panel.

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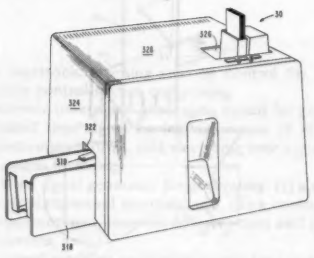
**3,964,672**

## PUNCHING, READING AND PRINTING MACHINE FOR DOCUMENT CARDS

**William Kenneth Aylsworth, Rochester; Willard Leon Gudgel, Byron, and Richard William Luoma, Chatfield, all of Minn., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed May 24, 1974, Ser. No. 473,250**
**Int. Cl.² G06K *1/20***
**U.S. Cl. 234—35** **3 Claims**



**1.** A processing machine for document cards having a first, hopper end and second, opposite end and comprising:

means forming a hopper at said first end of the machine for holding document cards vertically disposed and in the form of a horizontal card deck and including a horizontal hopper base on which said cards are disposed, said hopper base being provided with a throat gap through it at said first end of the machine through which a said card of the deck at said first machine end may pass moving downwardly, and means forcing said card deck along said horizontal hopper base in the direction from said second machine end to said first machine end so that said cards may feed one at a time downwardly through said throat gap,

a flat horizontal document card bed disposed at a lower level and at least partially below said hopper base,

means for changing the direction of movement of a said card passing through said throat gap from vertical to horizontal and disposing said card for forward travel in a path on said horizontal card bed toward a distal end of the card bed, said direction changing means including a rotatable roll disposed beneath said hopper base and above said horizontal bed around which the card is constrained to travel for approximately 90° of rotation,

a first operative means for operating on a said card and located beyond said distal end of said horizontal bed and in said path of travel of the card,

a second operative means for operating on a said card in said path of travel and located beyond said first means in said card path, said second operative means including a printer roll having an axis of rotation parallel with said card path, means for driving said printer roll, a row of print hammers extending parallel with the axis of said print roll and with said card path, and an electromagnet for actuating each of said print hammers each including a moveable armature, said electromagnets for alternate ones of said print hammers in said row being positioned on opposite sides of said path of card travel and said armatures of said electromagnets correspondingly being positioned on opposite sides of said row of print hammers and extending transversely of said path of card travel, and

means for moving a said card forwardly of said card bed and consecutively through said first operative means and then through said second operative means for operating on a said card.

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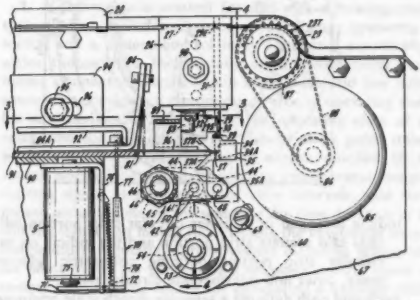
**3,964,673**

## TAPE PUNCH MACHINE

**Gerhard Cless, and Edward L. Kaplan, both of Northbrook, Ill., assignors to Extel Corporation, Northbrook, Ill.**

**Filed July 5, 1974, Ser. No. 485,906**
**Int. Cl.² G06K *1/02***
**U.S. Cl. 234—115** **19 Claims**



**8.** A cyclically operable tape punch machine for punching a tape in accordance with command signals and comprising:

a plurality of punch elements arranged in a die block for advancing and restoring movement;

a reciprocal driver bar having apertures receiving the shanks of the punch elements, said driver bar having a slot intersecting said apertures, said punch elements being supported to have the shank ends thereof exposed to the slot;

interposers moveable from a restored to an actuated position for selecting the punch elements and having the selector ends thereof disposed at the entry to said slot in the restored position;

means for actuating the interposers to move the end of an actuated interposer into the slot to support a punch element for movement with the driver bar;

said interposers and the means for actuating the interposers being supported as a unit on a bracket slidably mounted on a frame element of the machine; and

adjustable stop means for locating the bracket so that the selector ends of the interposers may be located at a predetermined restored position relative to said slot.

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**3,964,674**

## MENSTRUAL CYCLE CALCULATOR

**Harry Van der Gaast, 289 N. Hibiscus Drive, Miami Beach, Fla. 33139**

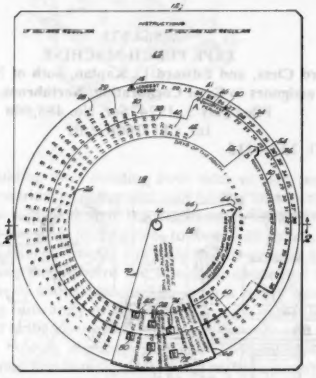
**Filed May 9, 1975, Ser. No. 576,047**
**Int. Cl.² G06C *3/00*; G04B *19/24***
**U.S. Cl. 235—88 RC** **2 Claims**

**1.** A calculator for computing menstrual cycles comprising:

A. a base panel, a first dial, a second dial, and a pointer and reader member, and dial pin means connecting said base, dials and pointer member for rotation about a common center and relative to said base panel, and said panel, dials and member having indicia arranged thereon in equi-angularly spaced scale units about said dial pin,

B. said base panel having:

indicia arranged in an outer arcuate strip portion defining a period scale composed of a plurality of equiangularly spaced cardianal number figures in progressively increasing order each figure being in a separate adjacent scale unit within the range of about 20 and 40 and each figure representing a different length, commonly encountered, menstrual period, and



indicia arranged in an inner circular strip portion adjacent said arcuate strip portion and the indicia on said circular strip portion defining concentric adjacent inner, outer and intermediate circular paths,

each said path defining a separate month scale composed of a series of equi-angularly spaced cardinal number figures each in an adjacent separate scale unit in progressively increasing order and each of said month scales being angularly spaced with respect to said period scale a predetermined number of scale units,

C. said first dial being circular and of a radius less than that of the inner path of said base panel and said first dial having an arcuate segment of a radius of curvature greater than the radius of the outer path of said base panel and less than the radius of the outer arcuate strip portion of said base panel,

said arcuate segment of the said first dial having indicia arranged in an outer arcuate strip portion defining a second period scale composed of a plurality of equi-angularly spaced cardinal number figures in progressively increasing order each figure being in a separate adjacent scale unit within the range of about 20 to 40 and each figure representing a different length commonly encountered menstrual period, and

indicia arranged in an inner circular strip portin adjacent said arcuate strip portion and the indicia on said circular strip portin defining concentric adjacent inner, outer and intermediate circular paths,

each said path defining a separate month scale composed of a series of equi-angularly spaced cardinal number figures each in an adjacent separate scale unit in progressively increasing order and each of said month scales being angularly spaced with respect to said period scale a predetermined number of scale units, and

a pointer means on said second dial to be positioned so as to point toward a figure in the period scale of the base panel to indicate the longest length of period experienced by the user,

D. a second generally circular dial of a radius less than the diameter of the first dial and having a days of the month scale composed of a series of numbers in a circular path said numbers being in progressive order and including the numerals 1 and 31 comprising a calendar scale representing the days of a month and said second dial including a pointer to be positioned so as to point toward a figure in the period scale of the second dial to indicate the shortest period experienced by the user, and

E. a pointer and reader member having a pointer to point to the day in the calendar scale corresponding to the date of the month on which the period of the user commenced and a reader segment at a predetermined fixed angular distance from said second pointer means and extending radially outwardly and over said paths for use in reading the figures on the paths.

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**3,964,675**

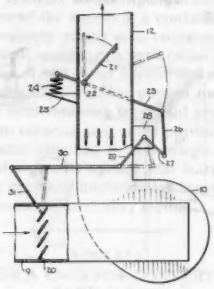
## APPARATUS FOR LIMITING VACUUM AND PRESSURE IN A FURNACE

**Perry C. Euchner, Jr., 8 Tracy Drive, Huntington, N.Y. 11743**

**Filed Oct. 15, 1974, Ser. No. 514,408**

**Int. Cl.² F23N *1/08***

**U.S. Cl. 236—15 C** **11 Claims**



**1.** In a furnace system having a combustion chamber, fan means and duct means connected to said chamber for moving gas along a path extending from exteriorly of and into said chamber, through said chamber and then outwardly from and away from said chamber, said fan means including at least one fan having an inlet and an outlet and the gas pressure internally of said chamber being at least partially dependent upon the level of flow of the gas which is supplied to and removed from said chamber, said chamber being subject to damage when said gas pressure internally of said chamber reaches a predetermined value, gas flow modifying means in said path for modifying the flow of gas through said chamber and control means comprising measuring means in said path and connected to at least part of said gas flow modifying means for normally maintaining the flow of said gas at predetermined levels required for normal operation of said system, the combination therewith of gas flow measuring means in the path of said gas outside said chamber and adjacent said fan, said last-mentioned measuring means being responsive to changes in the flow of said gas at one of said inlet and said outlet, and gas flow limiting means interconnecting said last-mentioned measuring means and at least part of said gas flow modifying means for changing the flow of said gas from said predetermined levels to further predetermined levels which are dependent upon the rate of flow of said gas exteriorly of said chamber, said further predetermined levels being higher with an increasing rate of flow of said gas exteriorly of said chamber and lower with a decreasing rate of flow of said last-mentioned gas but being less than the gas flow level which will cause the

gas pressure internally of said chamber to reach said predetermined value.

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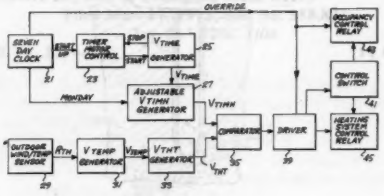
3,964,676

## ELECTRONIC MORNING START-UP CONTROL FOR A BUILDING TEMPERATURE CONTROL SYSTEM

Albert H. Rooks, and Everette E. Vermilion, both of Seattle, Wash., assignors to Albert H. Rooks, Seattle, Wash.

Filed Sept. 30, 1974, Ser. No. 510,490
Int. Cl.[2] F23N 5/20
U.S. Cl. 236—46 R 30 Claims




1. An electronic morning start-up control for a building temperature control system comprising:

1. electronic time signal generating means for generating a modified time signal having either one of at least two predetermined forms, said electronic time signal generating means including:

a. a time signal generator for generating: (i) a time signal at predetermined intervals, and, (ii) a control signal at predetermined intervals different than said time signal intervals; and,

b. a signal modifier connected to said time signal generator for receiving said time signal and said control signal and for modifying said time signal such that: (i) the first of said at least two predetermined forms of said modified time signal occurs in the absence of a control signal occurring simultaneously with the ocurrence of a time signal; and, (ii) the other of said at least two predetermined forms of said modified time signal occurs when a control signal occurs simultaneously with the occurrence of a time signal;

2. temperature sensing means for sensing the temperature in predetermined regions related to the building whose temperature is to be controlled and for generating a temperature signal related thereto;

3. electronic temperature signal modifying means connected to said temperature sensing means for electronically modifying said temperature signal to create a modified temperature signal;

4. comparison means connected to said electronic time signal generating means and to said electronic temperature signal modifying means for comparing said modified time signal with said modified temperature signal and for generating an output signal having a predetermined state when said modified time signal and said modified temperature signal compare in a predetermined manner; and,

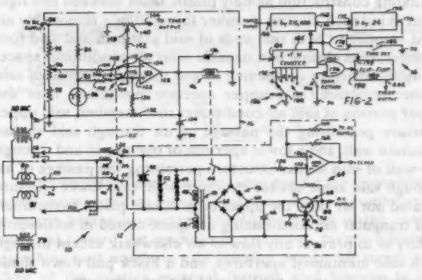
5. control signal means connected to said comparison means for creating a control signal adapted to shift the building temperature control system of said building whose temperature is to be controlled from one mode of operation to another mode of operation when the output of said comparison means indicates that said modified time signal and said modified temperature signal compare in said predetermined manner.

3,964,677

## ENERGY CONSERVING THERMOSTATIC CONTROL

Rudolph D. Schalow, and John T. Link, both of Fort Wayne, Ind., assignors to Energystics Corporation, Huntertown, Ind.

Filed Apr. 17, 1975, Ser. No. 568,846
Int. Cl.[2] F23N 5/20
U.S. Cl. 236—46 R 19 Claims




1. A thermostatic control for use with a heating/cooling system which includes a source of low voltage operating potential and a system control relay connected electrically in series therewith, a thermostatic control comprising source means connected electrically in series with said low voltage source for providing a continuous source of operating energy for said control irrespective of the operating state of said relay, and for generating a continuous clock pulse train of predetermined frequency, timing means coupled to said source means for cyclically generating a temperature set point shifting signal at predetermined time intervals, said timing means including means for selecting the time duration of said shifting signal and means for selecting the magnitude thereof, temperature regulating circuit means including temperature set point means for generating a set point control signal and temperature sensing means for generating a variable control signal proportional to the temperature in said area for generating a modulating signal to control the system, and thereby the temperature, in said area, said regulating circuit being connected to said timing means to receive said temperature shifting signal and being responsive thereto to alter one of said control signals and thereby the regulated temperature in said area.

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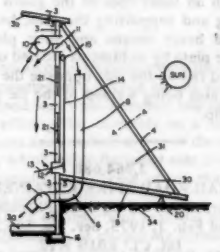
3,964,678

## SOLAR AIR CONDITIONER

Edward J. O'Hanlon, Assembly Point, Lake George, N.Y. 12845

Filed Nov. 4, 1974, Ser. No. 520,773
Int. Cl.[2] F24J 3/02
U.S. Cl. 237—1 A 1 Claim




1. In a solar air conditioner having a minimum of moving mechanism, and positioned on the outside of a shelter structure whose interior is to be heated or cooled by said solar air conditioner, said air conditioner comprising a substantially

flat platform extending outwardly from and connected to the outer wall of said shelter structure, a relatively thin yet substantially rigid corrugated sunlight penetrating sheet member forming a slanting roof over said platform member and of similar width, and connected to the outer wall of said shelter structure and connected along its lower edge to said platform member adjacent to the lower edge of said platform member, two similar triangular and closure end members being of heat insulating construction namely plastic foam between two rigid sheet skins each closure member fastened in a reasonably air tight manner to both side ends of said platform and said roof member, thus closing in a sizeable solar air conditioner space, an upper aperture or opening in and through the wall of said shelter structure, said upper aperture positioned near the upper portion of said air conditioner roof member, said upper aperture permitting the passage of air through said shelter structure wall, and a lower aperture or opening in and through the wall of said shelter structure permitting the passage of air through said same shelter structure wall, said lower aperture located not far from the upper edge of said platform member, said trangular air conditioning air space closed in sufficiently tightly as to prevent any flow of air elsewhere except through both said mentioned apertures, and a black pull down shade fastened to the outer wall of said shelter structure.

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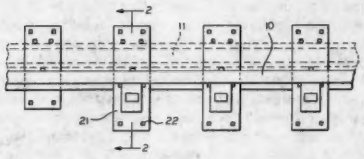
**3,964,679**

## RAILROAD GUARD RAILS

**Earl E. Frank, Tallman, N.Y., assignor to Abex Corporation, New York, N.Y.**

**Filed May 6, 1974, Ser. No. 467,403**
**Int. Cl.² E01B 5/18**
**U.S. Cl. 238—17** **6 Claims**




1. In combination with a traffic rail, a guard rail spaced laterally therefrom and so supported by a shim plate as to have the head thereof spaced above the head of the traffic rail, brace means located on the side of the guard rail away from the traffic rail, said brace means having an upper surface engaging the outer face of the guard rail head, said brace means having a portion beneath said upper surface engaging the web of the guard rail, a shim plate so supporting the base of the guard rail and having an upwardly extending lip in engagement with an inner face of the guard rail base, a tie plate underlying and supporting the rails, brace means and shim plate, said brace means and shim plate each being welded to the tie plate by weldments located outwardly of the base of the guard rail on the side opposite the traffic rail, and said shim plate also being welded to the tie plate by a weld located at said lip.

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**3,964,680**

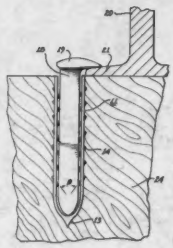
## RAILROAD SPIKE RETAINER

**David M. Arthur, 4020 N. 14th Ave., Phoenix, Ariz. 85013**

**Filed Feb. 3, 1975, Ser. No. 546,264**
**Int. Cl.² E01B 9/12**
**U.S. Cl. 238—366** **9 Claims**

1. Apparatus for maintaining a fixed, yet resilient orientation between a railroad rail and a supporting cross-tie, the apparatus comprising, in combination:

a. a load carrying rail including a flanged base;
b. a penetrable cross-tie for supporting the flanged base of said rail;
c. a spike for forceable insertion into said cross-tie, said spike including
   1. an elongated shaft; and
   2. an enlarged head portion located at one end of the elongated shaft for engaging the flanged base of said rail to secure said rail against substantial movement relative to said cross-tie; and
d. retention means between the elongated shaft of said spike and the cross-tie into which said spike is forceably inserted for semiresiliently retaining said spike in fixed relationship to said cross-tie, said retention means including



   1. a pair of elongated planar legs;
   2. a reinforced web for connecting the legs to form a U-shaped structure corresponding generally to the configuration of opposing sides of the elongated shaft of said spike; and
   3. a plurality of spaced louvers disposed laterally across both legs for engaging the elongated shaft of said spike and said cross-tie, selected ones of said louvers including
      i. means for resiliently connecting the louver to a leg while permitting limited relative movement between the louver and the connected leg; and
      ii. an edge for deformably engaging the shaft of said spike.

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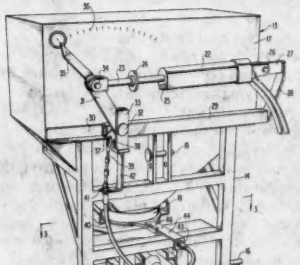
**3,964,681**

## AGRICULTURAL BROADCASTING APPARATUS

**Elmer R. Herd, P.O. Box 448, Logansport, Ind. 46947**

**Filed Sept. 4, 1975, Ser. No. 610,294**
**Int. Cl.² A01C 19/00**
**U.S. Cl. 239—650** **9 Claims**



1. Remotely controlled operating mechanism for a tractor mounted broadcaster, said broadcaster having a material discharge opening, a shiftable gate valve element adjacent said

opening to regulate the size of the same and a rotary material spreader element beneath the opening and gate valve element, said operating mechanism comprising a support means attached to said broadcaster, a crank arm pivotally mounted on said support means, a remotely controlled power operated extensible and retractable device interconnecting said crank arm and support means, and a shiftable means interconnecting said crank arm and said gate valve element and responding directly to movements of the crank arm to vary the position of the gate valve element relative to said material discharge opening.

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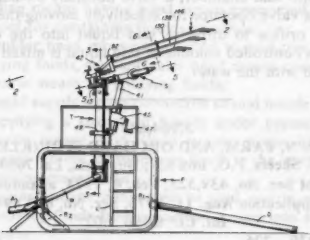
3,964,682

## METHOD AND APPARATUS FOR MAKING SNOW PRODUCED BY CUMULATIVE CRYSTALLIZATION OF SNOW PARTICLES

Philip L. Tropeano, 12 Revere St., and Joseph C. Tropeano, 20 Revere St., both of Lexington, Mass. 02173

Filed Mar. 17, 1975, Ser. No. 558,821
Int. Cl.² F25C 3/04
U.S. Cl. 239—2 S 11 Claims



1. In a method of making snow in which a mixture of compressed air and water under pressure is ejected from snow-making nozzle means in a cold ambient atmosphere and the mixture is expanded and cooled to form a stream of falling snow particles, the steps which include discharging high velocity chilled fluid jets into the falling snow particles from a plurality of jet nozzles occurring one above another in forwardly spaced relationship under a pressure of approximately 50 lb. p.s.i. to form vacuum pockets immediately in the rear of each nozzle extremity, spacing the jet nozzles apart from one another distances at which vacuum pockets of forwardly located nozzles induce acceleration of fluid jets discharged from jet nozzles located immediately rearwardly of the said forwardly positioned nozzles, and increasing the velocity of falling snow particles into which the accelerated fluid jets are discharged.

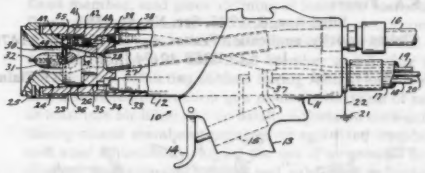
8. Improved snow-making apparatus comprising means for furnishing independently supplied flows of compressed air and pressurized water, tubular nozzle means for ejecting a mixture of the air and water into a cold ambient atmosphere to form a stream of snow particles, a plurality of jet nozzles located one above another in forwardly spaced relationship in a position to discharge fluid jets into the said stream of particles, means for conducting from the said supply of pressurized water, flows of fluid under pressures ranging upwardly to 50 lbs. p.s.i. into the said jet nozzles from which nozzles high velocity chilled fluid jets are discharged to form vacuum pockets immediately in the rear of each nozzle extremity, said nozzle extremities being spaced apart from one another distances at which vacuum pockets of forwardly located nozzles induce acceleration of fluid jets discharged from jet nozzles located immediately rearwardly of the said forwardly positioned nozzles.

3,964,683

## ELECTROSTATIC SPRAY APPARATUS

James J. Gimple, Toledo, Ohio, assignor to Champion Spark Plug Company, Toledo, Ohio

Filed Sept. 2, 1975, Ser. No. 609,669
Int. Cl.² B05B 5/02, 1/28
U.S. Cl. 239—15 7 Claims



1. An improved electrostatic spray gun for the deposition of a coating material on a workpiece comprising, in combination, a nozzle having a passage for emitting a flow of the coating material toward the workpiece, a housing, means releasably attaching said nozzle to said housing, means for supplying a flow of the coating material through said housing to said nozzle passage, means for electrostatically charging the material emitted from said nozzle passage, means for supplying gas at a predetermined high pressure to a passage having an end closed by said nozzle when said nozzle is attached to said housing, the pressure of such gas in said passage decreasing when said nozzle is loosened on said attaching means, means for sensing a drop in the pressure of such gas in said passage to below a predetermined low pressure lower than said predetermined high pressure, and means responsive to said pressure sensing means sensing a pressure drop to below said predetermined low pressure for interrupting said charging means from charging the coating material.

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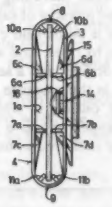
3,964,684

## DEODORIZING OR PERFUMING ASSEMBLY

Georg Schimanski, Hagen, Germany, assignor to Globol-Werk GmbH

Filed Oct. 15, 1975, Ser. No. 622,462
Claims priority, application Germany, Apr. 21, 1975, 281
Int. Cl.² A61L 9/04
U.S. Cl. 239—56 11 Claims



1. A deodorizing or perfuming assembly comprising

a casing consisting of a mantle having two open ends and two flattened side walls opposite one another.

means for affixing the assembly to a supporting surface which means are attached to one of the said flattened side walls and which latter flattened side wall has provided a slot or slots for the access of air therethrough to the interior of said mantle,

a plate or sheet of absorbent material being impregnated with a deodorizing or perfuming substance free from or having an insect repellent adjuvant, said sheet or plate being located in the interior of said mantle, and

clamping means protruding at least from one of the interior faces of said flattened side walls, and being adapted for

clampingly engaging said plate or sheet, to hold the latter fast with its surface spaced from the inside wall surface of said mantle.

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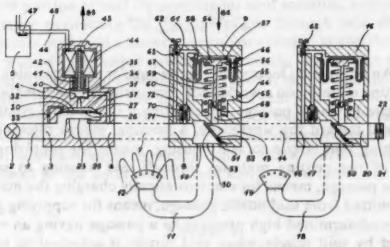
3,964,685

## LAWN SPRINKLING AND SIMILAR INSTALLATIONS

Michel Chauvigne, Cluses, France, assignor to Carpano & Pons S.A., France

Filed Apr. 3, 1975, Ser. No. 564,593
Claims priority, application France, Apr. 9, 1974, 74.12478
Int. Cl.² B05B 12/04
U.S. Cl. 239—66 11 Claims



1. A sprinkling or similar liquid-distribution installation comprising a plurality of dosing valves each having an inlet and first and second outlets, a liquid supply pipe connected to the inlet of a first dosing valve, a gate valve controlling the delivery of liquid through said supply pipe, the first outlet of each dosing valve being connected in operation to at least one sprinkler, piping connecting the second outlet of each dosing valve except a last dosing valve being to the inlet of a next sequential dosing valve, a plug in the second outlet of said last dosing valve, means having an orifice for discharging liquid from said piping connecting the dosing valves, said orifice communicating with the exterior to discharge liquid from said piping after closing of said gate valve, after closing of the first outlet of said last dosing valve, each dosing valve including a clapper, means for biasing the clapper to close the second outlet and leave the first outlet open, volumetric dosing means for closing the first outlet and simultaneously opening the second outlet after passage of a given quantity of liquid, said volumetric dosing means including a pusher having a first advanced position after passage of said given quantity of liquid in which first position it holds said clapper against the action of said biasing means to open said second outlet orifice and close said first outlet orifice, and a second withdrawn position in response to a drop in the pressure in said piping after opening of said discharge outlet, in which second position said pusher allows the clapper to move under the action of said biasing means to close said second outlet orifice and open said first outlet orifice.

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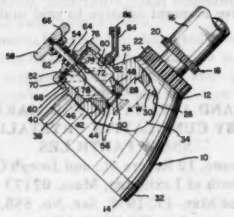
3,964,686

## SHOWERHEAD WITH SECONDARY LIQUID DISPENSER

Victor D. Lopez, Woodside, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Apr. 10, 1975, Ser. No. 567,000
Int. Cl.² B05B 7/24
U.S. Cl. 239—74 9 Claims

1. In a showerhead comprising a hollow body member having an inlet at one end for connecting to a plumbing conduit to receive a stream of water, an outlet spaced from the inlet for discharging the water, and a dispensing chamber defined intermediate said inlet and outlet, a thickened wall portion formed in the body member in the vicinity of said dispensing chamber, a reservoir comprising a cavity formed in said thickened wall portion and closure means for enclosing said cavity for storing a hygienic liquid, said thickened wall portion including an annular boss raised on the exterior of the body member, said boss having a passageway formed through a wall thereof, a filler port including a hollow tube disposed externally of the body member communicating with the reservoir for supplying liquid to the reservoir, coupling means connecting said tube to the boss with the hollow of the tube



opening into the passageway, said reservoir having an orifice opening into said chamber, a valve normally closing the orifice, and a valve operator for selectively moving the valve to open the orifice to dispense said liquid into the chamber, whereby a controlled amount of said liquid is mixed with and discharged with the water.

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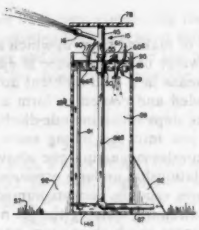
3,964,687

## LAWN, FARM, AND ORCHARD SPRINKLERS

Kerney T. Sheets, P.O. Box 637, Duplessis, La. 70806

Division of Ser. No. 439,323, Feb. 4, 1974, abandoned. This application Aug. 11, 1975, Ser. No. 603,496
Int. Cl.² B05B 3/02
U.S. Cl. 239—226 18 Claims



1. A lawn, farm, and orchard sprinkler comprising:

A. housing means having top means and bottom means, said housing means having bowl means connected to the top thereof for containing liquids or solids;

B. sprinkler head means connected to said top means for spraying fluids, said sprinkler head means comprising:

i. nozzle means for spraying fluids;

ii. liquid supply means connected to said nozzle means for supplying a steam of liquids under pressure to said nozzle means;

iii. first pump means connected to said nozzle means for pumping fluids from said bowl means into said nozzle means;

C. means connected to said top means for pumping fluids into the interior of said housing means;

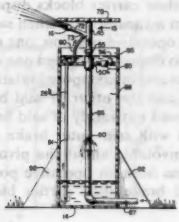
D. tube means connected to said top means for conveying fluids from said interior of said housing means to the interior of said bowl means, and

E. hole means in said top means for introducing liquids or solids into the interior of said housing means.

## 3,964,688
## LAWN, FARM, AND ORCHARD SPRINKLERS

Kerney T. Sheets, P.O. Box 637, Duplessis, La. 70806

Division of Ser. No. 439,323, Feb. 4, 1974, abandoned. This application Aug. 11, 1975, Ser. No. 603,495
Int. Cl.² B05B 3/02
U.S. Cl. 239—226 13 Claims

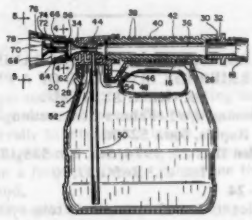


1. A lawn, farm and orchard sprinkler comprising:
A. housing means having top means and bottom means, said housing means having bowl means connected to the top thereof for containing liquids or solids;
B. sprinkler head means connected to said top means for spraying fluids, said sprinkler head means comprising:
i. nozzle means for spraying fluids;
ii. liquid supply means connected to said nozzle means for supplying a stream of liquids under pressure to said nozzle means, said liquid supply means having hole means therein for supplying liquid to the interior of said housing means, and
iii. pump means connected to said nozzle means for pumping fluids from said bowl means into said nozzle means;
C. tube means connected to said top means for conveying fluids from said interior of said housing means to the interior of said bowl means, and
D. hole means in said top means for introducing liquids or solids into the interior of said housing means.

## 3,964,689
## HOSE-END DISPENSER DEVICE

Stephen R. Horvath, Jr., Racine, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.

Filed Apr. 10, 1975, Ser. No. 567,029
Int. Cl.² B05B 7/30
U.S. Cl. 239—318 5 Claims

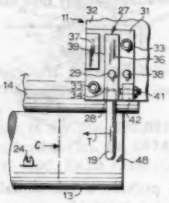


1. A hose-end dispenser device comprising:
a container defining an outlet opening;
a handle rigidly attached to said container and extending therealong adjacent said opening;
a rigid tube for carrier fluid flow overlying said handle and said opening, said tube having two ends and having insulating means along said handle;
fluid connection means from said container into said tube via said opening;
hose attachment means at one end of said tube; and
discharge means at the other end of said tube, said discharge means comprising a fixed cylindrical member forming an extension of said tube, said fixed member defining at least one lateral air inlet; an insert piece within said cylindrical member restricting the flow through said fixed member, said piece defining at least one restricted flow orifice upstream of said at least one air inlet; a cone-shaped deflector member attached to said insert piece in axial alignment with said fixed member and having an outside flow deflecting surface flaring radially outwardly in a downstream direction at a point downstream of said at least one air inlet; and an axially adjustable outwardly flaring nozzle member connected to said fixed member, said axial adjustability varying the size of an annular flow channel between said nozzle and said flow deflecting surface to provide foam spray patterns of varying width.

## 3,964,690
## APPARATUS FOR FORMING A PIECING END ON A YARN WINDING

Rene Tauleigne, Valence, France, assignor to Rhone-Poulenc-Textile, Paris, France

Filed Sept. 20, 1973, Ser. No. 399,111
Claims priority, application France, Sept. 22, 1972, 72.33927
Int. Cl.² B65H 54/02, 54/34
U.S. Cl. 242—18 PW 1 Claim



1. An apparatus for forming a piecing end for a main winding of yarn wound on a rotating spool, comprising:
a vertically extending pivot;
an arm means mounted for rotation about said pivot in a horizontal plane and at a point intermediate the opposite ends thereof, wherein said pivot divides said arm means into a first section and a second section of magnetic material;
a projection extending from one section of the arm means for engaging the yarn when the yarn is initially engaged with the spool prior to forming the main winding on the spool;
magnetic control means for engaging the second section of the arm means to both arrest pivotal motion of the arm means at a first position where the projection extends substantially normal to the axis of the spool and to hold the arm means in the first position while overlapping coils of yarn are formed on the spool, said control means holding said arm means until the yarn applies a predetermined threshold force to the projection to pivot the arm means, whereupon the yarn forms coils of increasing pitch on the spool until the yarn disengages from the spool to start forming the main winding, said magnetic control means including a magnet which magnetically attracts said second section of the arm means of magnetic material;
an adjustment means positioned to engage the first section of the arm to control the proximity of the second section to the magnet and thereby determine the magnitude of the predetermined force; and

stop means spaced from the control means for engaging the second section of the arm means to arrest pivotal motion of the arm means at a second position and to rebound the arm means to the first position as the yarn disengages from the projecting portion whereby the piecing end being formed by orienting the arm means initially at an angle substantially perpendicular to the spool.

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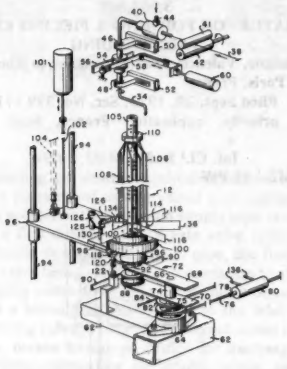
3,964,691

## METHOD AND APPARATUS TO TREAT YARN

Larry N. Pearce, and Grady H. Sanders, both of Spartanburg, S.C., assignors to Deering Milliken Research Corporation, Spartanburg, S.C.

Division of Ser. No. 776,534, Nov. 18, 1968, Pat. No. 3,618,184. This application Apr. 2, 1971, Ser. No. 130,585
Int. Cl.[2] B65H *54/00, 54/80, 75/24*
U.S. Cl. 242—47 11 Claims



1. Apparatus to provide a substantially tensionless yarn package comprising: a turntable, means rotably supporting said turntable, a spindle operably associated with said turntable, a rotably supported fiber supply means mounted above said spindle and said turntable, means to supply fiber to said fiber supply means and means operably associated with said turntable to lower said turntable at a predetermined rate, said spindle comprising a hollow center member, collar members secured to said center member at the top and bottom thereof, and a plurality of wire members pivotally secured in said collar members.

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3,964,692

## WINCH SPOOL WITH DISC BRAKE SYSTEM

Earl M. Pendleton, Houston, Tex., assignor to Mattco, Inc., Houston, Tex.

Continuation of Ser. No. 385,333, Aug. 3, 1973, Continuation-in-part of Ser. No. 180,569, Sept. 15, 1971, abandoned. This application Feb. 10, 1975, Ser. No. 548,669
Int. Cl.[2] B65H *75/00, 23/06, 59/38*
U.S. Cl. 242—54 R 18 Claims

1. A winch spool and brake assembly comprising:

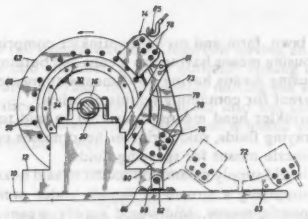
a winch spool having cable wound thereabout, said cable winding and unwinding relative to said spool upon rotation of said spool;

a pair of flanges one of which is disposed at each extremity of said spool for containing said cable as the cable is wound about the spool;

base means supporting said cable spool;

brake disc means extending from at least one of said flanges and having peripheral portion thereof disposed in spaced relation with said one of said flanges, said peripheral portion defining an inner brake surface spaced from and facing said one of said flanges and an outer brake surface facing away from said one of said flanges;

an elongated brake caliper means including a supporting arm means being of substantially the same thickness as the thickness of said brake disc, said supporting arm means having a connector portion at one extremity thereof, said connector portion being pivotally connected to said base means and supporting at least one pair of spaced brake shoe carrier blocks disposed one on each side of said arm means, so that when said supporting arm means is in an operative position, one of said brake shoe carrier blocks is disposed between one of said flanges and said brake discs and in juxtaposed relation with said inner brake surface and the other of said brake shoe carrier blocks is disposed outwardly of said brake disc in juxtaposed relation with said outer brake surface, said arm means being pivotable about the pivotal connection to said base means from an operative position, where said pair of spaced brake shoe carrier blocks receives the



periphery of said brake disc therebetween, and an inoperative position, where said caliper means rests upon said base means with said brake disc carrier blocks positioned for removal and replacement of brake shoe means;

brake shoe means being carried by each of said brake shoe carrier blocks for respective braking engagement with said inner and outer brake surfaces;

hydraulic actuator means being carried by each of said brake shoe carrier blocks and, upon being energized, causing braking movement of said brake shoe means;

hydraulic means for controllably energizing said hydraulic actuator means and being connected to each of said brake shoe blocks and causing simultaneous actuation of said hydraulic actuator means and said brake shoe means; and

releasable locking means supporting said arm means in a position relative to said brake disc that causes said caliper supporting arm means to be placed in tension by the force applied thereto during braking in one direction of the said spool's rotation.

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3,964,693

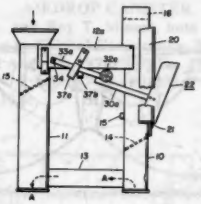
## COUNTERBALANCED DOOR MECHANISM FOR TELLER CARRIER RECEIVE TUBE OF A PNEUMATIC BANKING SYSTEM

William D. Thomas, c/o LeFebure Corporation, 308-29th St., NE., Cedar Rapids, Iowa 52406

Filed Dec. 23, 1974, Ser. No. 535,178
Int. Cl.[2] B65G *51/30*
U.S. Cl. 243—24 5 Claims

1. In the teller station of a pneumatic tube system for banking and the like including a carrier receive assembly having a carrier receive tube with a vertically disposed portion, an aperture in the side wall of said tube portion for removal of a carrier from the tube, a generally vertically disposed door hinged at its lower edge normally closing said aperture, and a stop to arrest a received carrier in a generally vertically disposed attitude in the tube so that the carrier is in a tilted position against the door, the improvement comprising: counterbalance means connected to the door, the counterbalance

means including lifting means extending generally horizontally from the door and past the receive tube when the door is closed, the lifting means moving in a generally vertical plane upon opening and closing movement of the door, and weighted means carried by the carrier receive assembly effective to be engaged and raised by the lifting means, the structure of the door and the location of its hinge being effective



so that the weight of a carrier when in said position against the door overcomes the counterbalance means and swings the door with the carrier thereon to an open position for removal of the carrier by a teller, the lifting means and the weighted means being thereafter effective to return the door to its closed position upon removal of the carrier from the door by the teller.

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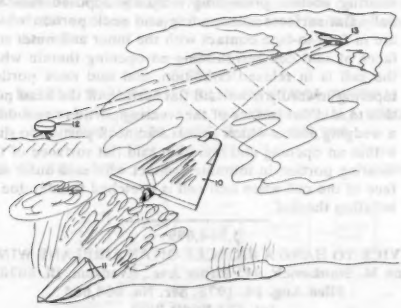
**3,964,694**

## AERIAL ACOUSTIC TARGET SEEKER

**Arthur C. Metzger, Wayland, Mass., and William Hadden, New Providence, N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Feb. 14, 1967, Ser. No. 617,763**
**Int. Cl.² F42B *15/02***
**U.S. Cl. 244—3.15** **1 Claim**



**1.** In a target-seeking flight vehicle having electrical signal-responsive flight-control means for guiding said vehicle vertically and laterally to intercept a target,

a detection-guidance control system therefor attuned to sounds in a frequency range below one thousand cycles per second,

said detection-guidance system comprising, a first and second pairs of spaced low-frequency sound-receiving electrical transducers carried by said vehicle for operation in vertically and laterally disposed relation in pairs and mounted and acoustically-shielded to receive sound waves from a target forward of said vehicle each over a limited angle,

means providing a pair of electrical signal control channels connected from each pair of sound transducers and with said flight-control means,

signal amplifier and rectifier circuits included in each of said channels and operative to produce directional-control output signals from each of said pairs of transducers dependent upon the received signal intensity thereon as determined by the location of a sound-emitting target with respect to said sound transducers and the angular limitations of the shielding thereon,

said rectifier circuits being phase dependent and each including a diode connected to receive and rectify signals from a related one of said amplifier circuits,

a clipper circuit connected to each of said rectifier circuits to clip the signal output therefrom,

a normally-open switching circuit connected to receive the amplified and rectified output of each sound transducer following each clipper circuit and connected together in pairs related to said pairs of sound transducers, each of said switching circuits including a normally-open bistable switch and an AND gate connected therein to control and close said switch and thereby the switching circuit periodically in response to a clipped sound signal from one clipper circuit of a pair and not the other, the periodic ON time of said bistable switch being representative of the phase difference between the sound received by said transducers of a pair, thereby to pass clipped direction control output signals to said flight control means in response to received sound signals from one transducer of each pair and not the other, and

signal integrator circuits connected with said switching circuits in pairs to produce said directional control signals from each pair of transducers for said flight-control means,

thereby to maintain said vehicle on course to the target.

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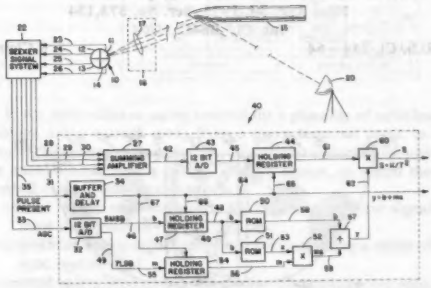
**3,964,695**

## TIME TO INTERCEPT MEASURING APPARATUS

**James C. Harris, 2646 Albert Drive, Grand Rapids, Mich. 49506**

**Continuation-in-part of Ser. No. 298,051, Oct. 16, 1972, abandoned. This application Oct. 10, 1974, Ser. No. 513,602**
**Int. Cl.² F41G *7/00*; F42B *15/02*; G06F *15/50***
**U.S. Cl. 244—3.16** **20 Claims**



**1.** An apparatus for providing an output signal which varies in accordance with the time period from an instant position of a first body to the point of closest approach of the first body to a second body moving in paths to approach one another; said apparatus including:

sensor means on said first body for detecting radiation coming from the second body and providing a first signal which varies in accordance with a predetermined characteristic of the detected radiation; and

first means responsive to said first signal for providing a second signal which varies in accordance with the ratio of the instantaneous value of said first signal to the average value of said first signal, from an initial instant of time when said values are substantially equal, during the movement of said bodies toward one another as the distance

between said bodies decreases during their movement toward one another.

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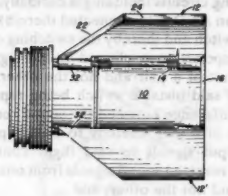
3,964,696

## METHOD OF CONTROLLING THE SPIN RATE OF TUBE LAUNCHED ROCKETS

Casimir T. Orzechowski, Kensington; Nat Seiden, Brandywine, and Anthony Mycka, Jr., Waldorf, all of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 30, 1974, Ser. No. 519,371
Int. Cl.² F42B 13/32
U.S. Cl. 244—3.23 4 Claims



1. Means for improving the ballistic accuracy of a missile comprising:

a set of fins located around the body of a missile, said fins being curved in the radial direction of the missile and being formed with a bevel along the concave side of the leading edge of the fin,

the leading edge of said fin also being formed with a sweepback angle along the entire leading edge.

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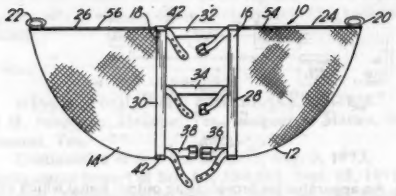
3,964,697

## DEPLOYABLE WING BACK PACK

Kittrell W. Mays, Miami, Fla., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Apr. 30, 1975, Ser. No. 573,134
Int. Cl.² B64C 31/04
U.S. Cl. 244—64 8 Claims



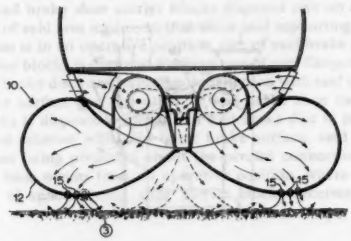
1. Wing apparatus adapted to be worn by a man comprising: a pair of wings, said wings, adapted to be operatively manipulated by opposite arms of a man via a pair of handle means respectively carried by said pair of wings, housing means for storing said wings, said housing means having a pair of opposed external sides, each side having an elongated opening for the introduction of a wing into said housing means with said handle means protruding from said housing means and harness means for securing said housing means to the back of a man with said openings running along the sides of the man whereby said wings may be deployed by pulling said handle means.

3,964,698

## AIR CUSHION TYPE UNDERCARRIAGE FOR AIRCRAFT

T. Desmond Earl, Buffalo, N.Y., assignor to Textron, Inc., Providence, R.I.

Filed June 5, 1974, Ser. No. 476,387
Int. Cl.² B64C 25/56
U.S. Cl. 244—100 A 9 Claims



8. An air cushion undercarriage for supporting a vehicle relative to a reaction surface and comprising, in combination:

an air inflatable cell fabricated from elastic material and adapted to be inflated from a relaxed condition to an inflated, stretched condition circumscribing an air cushion space and presenting a footprint area around said air cushion space which may contact and scrub against the reaction surface, said cell having a pattern of openings in said footprint area at least some of which are adapted to discharge jets of air from internally of the cell to supply superatmospheric air to said air cushion space; and

a plurality of protective devices positioned in at least certain of said openings throughout said footprint area to protect said cell from damage due to scrubbing against said reaction surface, each such device comprising a body having an intermediate neck portion slidably received in an opening and capped at one end by an enlarged head portion and subtended at its other end by an enlarged diameter wearing portion, said head portion and said wearing portion presenting mutually opposed substantially flat surfaces surrounding said neck portion which are in face-to-face contact with the inner and outer surfaces of said cell surrounding an opening therein when the cell is in relaxed condition, and said neck portion tapering inwardly from said flat surface of the head portion to said flat surface of the wearing portion to produce a wedging action which causes said neck portion to slide within an opening and maintain said flat surfacee of the wearing portion in intimate contact with said outer surface of the cell when said cell is stretched thinner due to inflation thereof.

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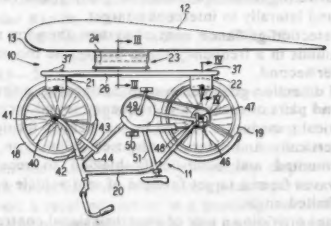
3,964,699

## DEVICE TO HANG A BICYCLE ON AN AIRPLANE WING

Frank M. Stankovich, 945 Pitner Ave., Evanston, Ill. 60202

Filed Aug. 14, 1975, Ser. No. 604,664
Int. Cl.² B64D 9/00
U.S. Cl. 244—118 R 5 Claims



1. A device for hanging a bicycle in an inverted position beneath a wing of an airplane comprising first means for

rigidly engaging each wheel of a bicycle and for locking the wheels against rotation, and second means for mounting the first means beneath the lower surface of the wing with the wheels aligned with the direction of flight of the airplane, said second means including pivot means to allow the bicycle to swing in a limited arc in a direction perpendicular to the direction of flight.

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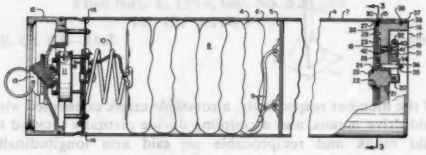
**3,964,700**

## AIRDROP CANISTER

**Gary V. Adams, and Roy T. Minert, both of Brigham City, Utah, assignors to Thiokol Corporation, Newtown, Pa.**

**Filed Aug. 26, 1974, Ser. No. 500,413**
**Int. Cl.² B64D *1/02***
**U.S. Cl. 244—138 R** **7 Claims**



1. An airdrop canister comprising:
- a cylindrical case having an intermediate partition therein that divides the case into a housing and a canister;
- a parachute in the housing and attached thereto;
- means for deploying the parachute;
- a timer in the housing, operatively connected to the means for deploying the parachute so that the parachute may be deployed thereby after a predetermined time interval;
- an end cap engageable to the housing for retaining the contents therein; and
- a removable end cap on the canister that creates a hermetic seal therewith; and
- a pressure relief valve in the canister end cap, in communication with the interior of the canister and operable from outside the end cap, whereby air pressure on both sides of the end cap may be equalized to facilitate removal thereof.

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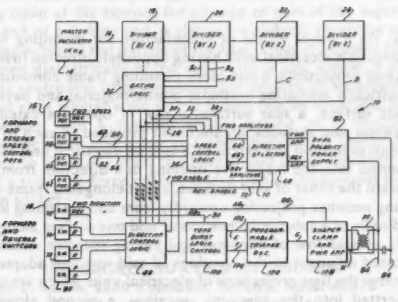
**3,964,701**

## MODEL RAILROAD TRAIN CONTROL SYSTEM

**John Kacerek, 97 Ravine Ave., West Caldwell, N.J. 07006**

**Filed May 27, 1975, Ser. No. 580,990**
**Int. Cl.² B61L *3/24***
**U.S. Cl. 246—2 F** **4 Claims**



1. A system for simultaneously driving dc motor driven electric trains at speeds and directions independent of each other along a track to which power is fed, said circuit comprising:
- means for generating a repetitive ultimate duty cycle;
- means connected to said aforementioned means for dividing said duty cycle into a plurality of spaced apart timewise time slots, said time slots being separated from one another by an equal plurality of time gaps;
- an equal plurality of variable amplitude and polarity dc voltage sources;
- means for interconnecting one of said voltage sources with said track during each of said time slots;
- means for generating signals of differing discrete frequencies during each of said time gaps of the ultimate cycle;
- a dc motor and a sensor mounted in each of said trains, said sensor including frequency responsive means tuned to one of said discrete frequencies;
- a dual polarity latching subcircuit connected in series with said train dc motor across said track; and,
- latch driving means interconnecting said frequency responsive means and said latching subcircuit to latch said latching subcircuit and motor across said track during the time slot following the gap in which said discrete frequency signal was generated.

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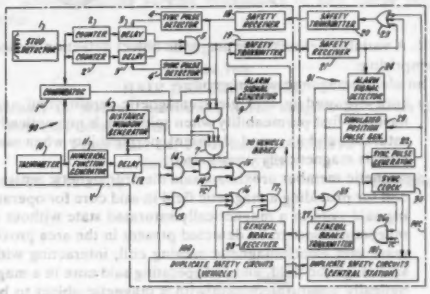
**3,964,702**

## ANTI-COLLISION SAFETY DEVICE FOR A PASSENGER TRANSPORT SYSTEM ON TRACKS

**Regis Lardennois, Verriere-le-Buisson; Michel Robert, Gif-sur-Yvette; Robert Gabillard, Lille, and Edouard Rubin, Bures-sur-Yvette, all of France, assignors to Engins Matra, Paris, France**

**Continuation-in-part of Ser. No. 432,811, Jan. 14, 1974, abandoned. This application Jan. 29, 1975, Ser. No. 544,916**
**Claims priority, application France, Jan. 15, 1973, 7301345**
**Int. Cl.² B61L *27/04***
**U.S. Cl. 246—4** **10 Claims**



1. An anti-collision safety control for a plurality of vehicles moving along a track away from a given terminal point, including a corresponding plurality of vehicle control units, one on each vehicle, and a central control station, in which the central control station comprises:
- central safety receiver means for receiving position signal from the vehicles;
- a synchronization signal generator for generating a series of sync signals; and
- central safety transmitter means for transmitting the sync signals and the received position signals to all of the vehicles; and in which each vehicle control unit comprises:
- distance measuring means for continuously measuring the distance of the vehicle from the terminal point;
- vehicle safety receiver means for receiving the sync signals and position signals from the central control station;
- position signal generator means, coupled to the distance measuring means and to the vehicle safety receiver means, for generating a local position signal for the vehicle carrying the control unit, following a received sync signal, at a time representative of the distance of the vehicle from the terminal;
- vehicle safety transmitter means for transmitting the local position signal to the central control station to complete a control loop linking the vehicle and the central control station;

stop distance means, coupled to the position signal generator means, for generating a vehicle stop distance signal, following the local position signal, at a time representative of a safe stopping distance for the vehicle;

and vehicle brake control means, coupled to the vehicle safety receiver means and the stop distance means, for actuating the brakes of the vehicle whenever the next position signal following the local position signal is received prior to the stop distance signal.

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**3,964,703**

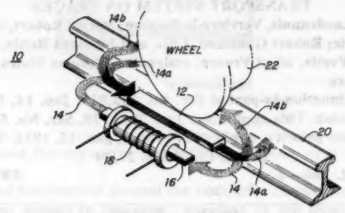
## MAGNETIC OBJECT DETECTION

**Joseph R. Wilkas, Walpole; Christos B. Kapsambelis, Canton; Richard H. Tuhro, Norwood, and Christopher C. Reynolds, Stoughton, all of Mass., assignors to Computer Identics Corporation, Westwood, Mass.**

**Filed Mar. 17, 1975, Ser. No. 559,252**

**Int. Cl.² B61L 1/16**

**U.S. Cl. 246—34 R** **10 Claims**




1. A variable permeability magnetic object detection device comprising:

an electromagnetic sensing coil;

a core disposed in said electromagnetic sensing coil and having a first permeability when said core is magnetically saturated and a second, different, permeability when said core is magnetically unsaturated;

a magnetic member proximate said electromagnetic sensing coil for providing a magnetic field in said core for operating said core in a magnetically saturated state without a magnetic object to be detected present in the area proximate said electromagnetic sensing coil, interacting with said magnetic field, and for operating said core in a magnetically unsaturated state with a magnetic object to be detected present in the area proximate said electromagnetic sensing coil, interacting with said magnetic field; and

means, responsive to said electromagnetic sensing coil, to detect the presence of a magnetic object.

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**3,964,704**

## OPERATING MECHANISM FOR RAILROAD CROSSING GATE

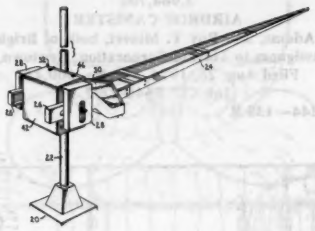
**Jerry W. Karr, Blue Springs, Mo., assignor to Harmon Industries, Inc., Grain Valley, Mo.**

**Filed Sept. 23, 1974, Ser. No. 508,670**

**Int. Cl.² B61L 29/22**

**U.S. Cl. 246—125** **12 Claims**

1. In a gate mechanism having a gate member mounted for swinging movement about a generally horizontal axis between a raised position and a lowered position corresponding to open and closed conditions of the gate respectively, and where drive means is employed for rotating said gate member about said axis to swing the member from said lowered to said raised position, the improvement comprising force transmitting means coupling said drive means with said member and providing high mechanical advantage at the start of upward movement thereof, substantially lower mechanical advantage after the member is in motion, and progressively increased mechanical advantage as the member approaches its raised position, whereby to minimize the starting load on the drive means, accelerate the member once it is in motion, and then reduce the speed of the member as it nears the end of its travel, said force transmitting means including an operating arm extending transversely of said axis and secured to said member, said arm having first and second angularly spaced positions corresponding to said raised and lowered positions



of the member respectively, a rotatable crank connected with said drive means, and a coupling device pivotally secured to said crank and reciprocable on said arm longitudinally thereof, said drive means being operable to rotate said crank in a direction to swing said arm from said second to said first position thereof to thereby swing said member to its raised position.

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**3,964,705**

## FRAME FOR THE MOUNTING OF INTERCHANGEABLE ELECTRICAL UNITS

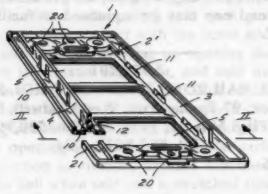
**Zago Giovanni, Milan, Italy, assignor to Bassani S.p.A., Milan, Italy**

**Continuation-in-part of Ser. No. 210,663, Dec. 22, 1971, abandoned. This application Oct. 24, 1974, Ser. No. 517,830**

**Claims priority, application Italy, Dec. 23, 1970, 23782/70**

**Int. Cl.² A47F 5/08, 7/00; H01R 9/00**

**U.S. Cl. 248—27 R** **7 Claims**



1. As a novel article of manufacture for mounting interchangeable electrical units having oppositely directed first and second projections, a one-piece mounting frame consisting of electrically insulating synthetic plastic material and having a front surface, a rear surface, a row of openings extending between said surfaces, an abutment provided in each of said openings to limit the extent to which an electrical unit can be inserted into the respective opening in a direction from one toward the other of said surfaces, a first elongated frame-stiffening member projecting upwardly from and extending longitudinally of a substantial portion of said one surface along one side of said row of openings and having recesses which are located adjacent to the openings of said row and adapted to receive the first projections of electrical units which are being insertted into the adjoining openings, a second elongated frame-stiffening member projecting upwardly from and extending longitudinally of a substantial portion of said one surface along the other side of said row of openings and having elastic tongues which face said recesses and are deformable by the second projections of electrical units from first to second positions during insertion of such units into the adjacent openings while the first projections of the units extend into the

corresponding recesses of said first member, to subsequently reassume said first positions and to thereby overlie the respective second projections so as to retain the units in their openings, and passages extending between said front and rear surfaces and each in line with a portion of one of said tongues in the first position of the respective tongue so that a tool which is inserted into a passage in a direction from said other toward said one surface can engage and move the corresponding tongue from the first to the second position thereof and to thus permit removal of an electrical unit from its opening.

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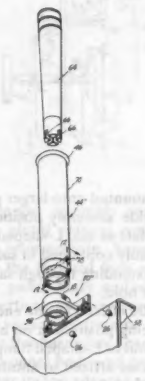
**3,964,706**

## HOLDER ASSEMBLY FOR FISHING RODS AND FISHING ACCESSORIES

**John R. Adams, 835 Summit Ave., Franklin Lakes, N.J. 07417**

**Filed Nov. 1, 1974, Ser. No. 520,169**
**Int. Cl.² A01K *97/10***
**U.S. Cl. 43—21.2** **14 Claims**



**1.** A holder assembly for fishing rods and like fishing accessory devices, comprising a mounting base having at least one tubular socket fixed thereon, said mounting base including at least one flat portion and a pair of keyhole slots therein each slot having a portion of small width to receive the shank and a portion of larger width to pass the head of a keyhole screw or nail for readily securing and detaching the base to and from a supporting surface, said socket having an upper part of given diameter and a lower part of lesser diameter, said lower part being open at the bottom for passage of part of the tapered butt end of a fishing rod, a sleeve for slidably receiving and holding a fishing rod handle or the like, a pair of bayonet slots disposed diametrically in the upper rim of said socket, a pair of pins protruding from said sleeve for detachable securement in said slots whereby the sleeve is also readily securable and detachable, and a resilient washer seated on a shoulder formed between said upper and lower parts of the socket and serving to resiliently press the base of said sleeve upwardly to exert a retaining force on said sleeve pins in the bayonet slots of the socket.

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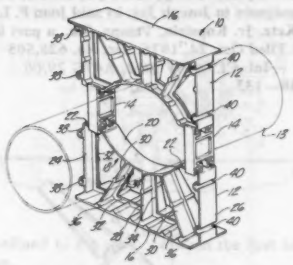
**3,964,707**

## UNDERGROUND CONDUIT HOLDER

**Gerald F. Lewis, 1850 Columbia, Berkley, Mich. 48072**

**Filed Dec. 23, 1974, Ser. No. 535,664**
**Int. Cl.² A47G *29/02***
**U.S. Cl. 248—49** **2 Claims**

**1.** An underground conduit holder comprising a pair of holding frames, each of said holding frames having a conduit engaging portion to engage an outer surface of a conduit in diametrically opposed relation to each other and being disposed in a common plane transverse to the axis of said conduit, each of said frames including a flange portion adjacent opposite ends of said conduit engaging portion, a pair of clamp structures each of which includes a body member, a pair of latch elements extending from one end of said body member for engagement with one of said flange portions of one of said frames, and a pair of latch elements extending from the other end of said body member for engagement with the corresponding one of the flange portions of the other of



said frames to prevent separation of the said frame members relative to each other axially and radially of said conduit, each of said latch elements including a hook element and a stop element connected to said hook element, said stop and hook elements presenting facing surfaces deflectable relative to each other to engage opposite surfaces of said flange portions for accommodating varying thicknesses of said flange portions.

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**3,964,708**

## HAIR DRYER CRADLE

**Michael G. Reeves, Scottsdale, Ariz., assignor to Gloria J. Reeves, Phoenix, Ariz.**

**Filed Mar. 14, 1975, Ser. No. 558,212**
**Int. Cl.² A47F *5/08***
**U.S. Cl. 248—126** **5 Claims**

**1.** A cradle for supporting a hand held beauty appliance comprising in combination:

a supporting base,

a contoured hollow housing for mounting on said base and defining an aperture extending through its surface for detachably receiving a cylindrically shaped chamber in a sliding fitting arrangement therein,

a cylindrically shaped chamber slidingly fitted into said aperture of said housing,

means mounted on said chamber for interconnecting said chamber at one end thereof with said base for controlling the positioning of said chamber in said housing,

said chamber being formed to receive and support therein a hand held beauty appliance,

said means for interconnecting said chamber at one end thereof with said base comprising an apertured plate mounted at said one end of said chamber, and

a protrusion mounted on said base,

said protrusion penetrating said apertured plate in one of two inserted positions of said chamber in said aperture of said housing for detachably interconnecting said chamber with said base.

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**3,964,709**

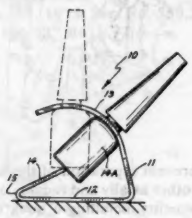
**NAIL POLISH BOTTLE RETAINER**

**Joan P. LaBelle, and George Ketz, Jr., both of Minneapolis, Minn., assignors to Joseph Jay, by said Joan P. LaBelle and George Ketz, Jr. Kopstein, Tampa, Fla., a part interest**

**Filed Oct. 24, 1975, Ser. No. 625,505**

**Int. Cl.² A47F *5/12*; A47G *29/00***

**U.S. Cl. 248—133** **3 Claims**




1. Support means for retaining and adjustably positioning and securing cosmetic bottle receptacles in predetermined disposition about an arc extending from a generally upright disposition to a tilted disposition generally 65° from said upright disposition, said support means comprising:

a. an elongated continuous flexible support body having a base pad portion, a bottle engaging support leg in a plane disposed at an acute angle from the plane of said base pad portion and extending from one end of said base pad portion, and a bottle retaining portion extending from the opposed end of said base pad portion;

b. said bottle engaging support leg portion terminating along a terminal edge disposed in elevated disposition relative to the plane of said base pad portion;

c. said bottle retaining portion having a generally arcuate configuration with the center of arc being generally coincidental with said terminal edge and with said bottle retaining portion being elevated above said terminal edge and having a surface in opposed disposition to said terminal edge, and slot means being formed within said bottle retaining portion between lateral edge strip zones, said slot being arranged to receive and retain only the neck portion of a cosmetic bottle therewithin, and with the base of said lateral edge strips being arranged to abut against the shoulder of a bottle being retained therewithin;

d. the arrangement being such that upon inserting a bottle within said support means and upon said terminal edge, said bottle retaining portion flexes resiliently away from said terminal edge so as to grip the bottle between said terminal edge and the inner surface of said arcuate bottle retaining portion.

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**3,964,710**

**SUSPENDED CEILING LEVELING DEVICE**

**Andrew Conroy, Newark, N.J., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest**

**Filed Dec. 6, 1974, Ser. No. 530,190**

**Int. Cl.² F16B *47/00***

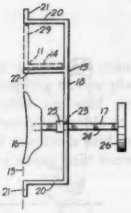
**U.S. Cl. 248—206 R** **1 Claim**

1. A suspended ceiling leveling device for leveling a 90° angle component of a guide assembly of a suspended ceiling which comprises:

a. an elongated rectangularly shaped plate having a center transverse hole therethrough;

b. L-shaped flange members affixed perpendicularly to each end of said plate, each said L-shaped flange member having a longer leg and a shorter leg, said longer leg joined perpendicularly to said plate, said shorter leg of each said member parallel to said plate and extending away from said plate, each said shorter leg adapted to engage a vertical wall;

c. a smaller flat rectangularly shaped plate affixed perpendicularly to said elongated rectangularly shaped plate between one said L-shaped flange member and said hole, said smaller plate positioned on the same side of said larger plate as each said L-shaped flange member, said 90° angle component adapted to rest on top of said smaller plate and engage against said vertical wall;




d. a guide assembly mounted onto larger plate at said transverse hole, said guide assembly positioned on the same side of said larger plate as said L-shaped flange members;

e. a rod member slidably contained in said guide assembly, said rod member extending through said guide assembly and said transverse hole;

f. a circular disc handle affixed to one end of said rod member, said handle being positioned on an opposite side of said large plate to that of L-shaped flange members; and

g. a suction cup member affixed to another end of said rod member, said suction cup member positioned on said same side of said larger plate as said L-shaped flange members, said suction cup positioned between one said flange member and said smaller plate, said suction cup member engaging said vertical wall.

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**3,964,711**

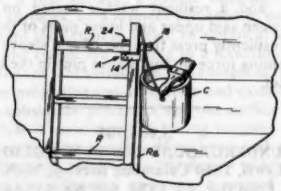
**BRACKET FOR ENGAGEMENT WITH THE RUNG AND RAIL OF A LADDER FOR SUPPORTING AN ARTICLE**

**Ordell R. Lund, 1915 E. Ninth St., Duluth, Minn. 55812**

**Filed June 25, 1975, Ser. No. 590,022**

**Int. Cl.² B44D *3/14***

**U.S. Cl. 248—210** **2 Claims**




1. A device for mounting articles on a ladder comprising:

a. a pair of brackets each having a main arm which terminates in

b. a first angularly disposed end portion for engagement with the rung of a ladder and which terminates in a lip angularly disposed to said first end portion and overlying

said main arm to form a hook formation, for engagement with the rung of a ladder,

c. said main arm terminating at its second end in a second angularly disposed end portion,

d. a bar connected to said second angularly disposed end portion of each of said brackets for positioning across the rails of a ladder,

e. a tray, and

f. means for mounting a tray on said bar.

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**3,964,712**

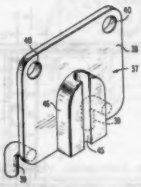
## APERTURED PANEL BRACKET

**Walter J. Staudte, Jr., 514 S. 15th, Sunnyside, Wash. 98944**

**Division of Ser. No. 387,625, Aug. 13, 1973, Pat. No. 3,879,006. This application Feb. 5, 1975, Ser. No. 547,119**

**Int. Cl.² E06B 7/28; A47F 5/00**

**U.S. Cl. 248—223** **4 Claims**



**1.** An article support assembly comprising an apertured panel body having plural vertical rows of apertures formed therethrough, an intermediate hanger stabilizing device adapted to engage the forward face of said panel body and lying between the panel body and an article hanger, said device having a vertical groove means therein adapted to receive and seat a vertical portion of an article hanger, said device comprising a flat base plate spanning two vertical rows of apertures in said panel body and having a pair of laterally spaced openings near its top adapted to register with a pair of apertures in laterally adjacent rows on the panel body, said base plate having a pair of laterally spaced studs near its bottom engageable within a pair of laterally spaced apertures in said panel body, an article hanger having a vertical part engageable releasably within said vertical groove means and seated therein and being stabilized thereby, and a pair of studs on said article hanger near its top engageable through said openings of the base plate and through a registering pair of apertures in said panel body.

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**3,964,713**

## REVERSIBLE SEAT LOCK

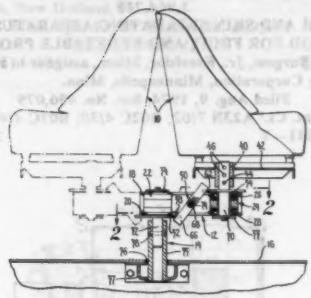
**Gerald L. Joslyn, Auburn Heights, Mich., and George W. Bingley, Kankakee, Ill., assignors to Massey-Ferguson Inc., Detroit, Mich.**

**Filed Jan. 16, 1975, Ser. No. 541,675**

**Int. Cl.² B60N 1/02**

**U.S. Cl. 248—418** **2 Claims**

**1.** A movable seat for a vehicle comprising a horizontally disposed support, means mounting said support on said vehicle for pivotal movement about a first vertical axis, a seat, means mounting said seat on said support for pivotal movement about a second vertical axis, a first disc element mounted in a stationary position relative to said first axis, a second disc element mounted on said seat for movement with the latter about said second axis, a lock member mounted on said support for swinging movement about a horizontal axis between a first position engaging said first and second disc elements to prevent pivotal movement of said support relative to said vehicle and said seat relative to said support and a second position in which said support and said seat are free to pivot relative to each other and to said vehicle about said first and second axes, said first and second disc elements disposed at opposite upper and lower sides of said support, said lock



member confined to the space between the first and second vertical axes.

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**3,964,714**

## MATERIAL UNLOADING IMPLEMENTS

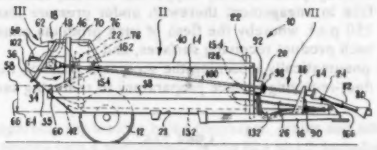
**Alexander Crawford, Guy's, and Alfred J. Bailey, Berkswell, both of England, assignors to Massey-Ferguson Services N.V., Curacao, Netherlands**

**Filed May 8, 1975, Ser. No. 575,566**

**Claims priority, application United Kingdom, May 10, 1974, 20667/74; Dec. 11, 1974, 53600/74**

**Int. Cl.² A01C 23/00**

**U.S. Cl. 239—662** **7 Claims**



**1.** A material unloading implement comprising

a material container;

a material unloading rotor mounted on the material container and operable to unload material therefrom;

material feed means operable to feed material within the container to the material unloading rotor;

characterized in that

the material container includes an upwardly extending rear wall at the rear thereof below the material unloading rotor, said rear wall sloping downwards and forwards from the material unloading rotor;

the material unloading rotor is mounted on the container at the rear of the implement for rotation about a horizontal axis extending transverse to the direction of usual forward motion of the implement, adjacent and upwardly extending wall of the container and is operable to unload material from within the container over said wall, the material unloading rotor being mounted at a level such that when the material unloading implement is in its working attitude and is standing on horizontal ground, a horizontal plane touching the lowest point on the circular path described by the radially outermost portions of the rotor is spaced above a horizontal plane touching the lowest point in the material container; and

the material feed means comprises a material pushing member mounted in the material container so as to be movable towards the material unloading rotor, and drive means to move the material pushing member whereby the

material pushing member moves material within the container towards the material unloading rotor.

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**3,964,715**

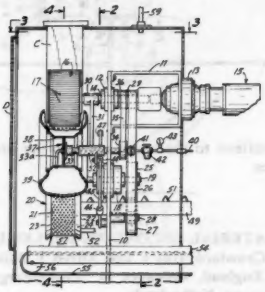
**FLESH AND SKIN SEPARATING APPARATUS AND METHOD FOR FRUIT AND VEGETABLE PRODUCTS**

**Ralph D. Burgess, Jr., Excelsior, Minn., assignor to Food Engineering Corporation, Minneapolis, Minn.**

**Filed Aug. 9, 1974, Ser. No. 496,079**

**Int. Cl.² A23N 7/02; B02C 4/30; B07C 4/40**

**U.S. Cl. 241—7** **26 Claims**



**26.** The method of separating skins from the flesh of fruits and vegetable products consisting in:

a. passing such products between a rotating perforated product-receiving surface and an oppositely rotating directly pneumatically supported flexible, resilient surface in engagement therewith under pressure less than 150 p.s.i. whereby the flesh of such products remain on such product receiving surfaces, and

b. pneumatically loosening the separated skins on the product-receiving surface preparatory to removing same.

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**3,964,716**

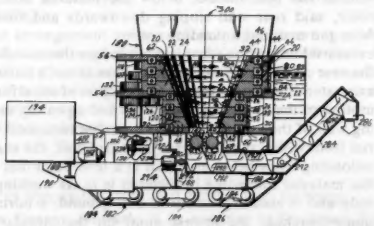
**WOOD PROCESSING UNIT FOR REDUCING AIR POLLUTION**

**Alfred S. McCorkle, Kirkland, Wash., and Charles L. Hoar, Portland, Oreg., assignors to McCorkle Children Trust, Kirkland, Wash.**

**Filed Sept. 3, 1970, Ser. No. 69,268**

**Int. Cl. B02c 19/12**

**U.S. Cl. 241—28** **28 Claims**



A process for reducing the size of an object, said process comprising:

a. contracting said object with a rotating abrasive means to divide said object into smaller pieces of said object;

b. introducing said object to an abrasive means having through passageway so that said object is reduced in size to pass through said passageway;

c. introducing said object to a first rotating abrasive means having a through passageway; and,

d. introducing said object after leaving said first rotating abrasive means to a second rotating abrasive means having a through passageway.

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**3,964,717**

**TUBE MILL**

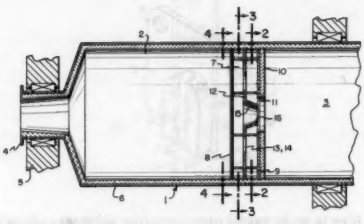
**Ib Hansen, Copenhagen Valby, Denmark, assignor to F. L. Smidth & Co., Cresskill, N.J.**

**Filed Sept. 5, 1974, Ser. No. 503,306**

**Claims priority, application United Kingdom, Sept. 10, 1973, 42365/73**

**Int. Cl.² B02C 17/00, 17/18**

**U.S. Cl. 241—71** **18 Claims**



**1.** A tube mill for dry grinding a granular material and the like comprising at least one grinding compartment charged with grinding bodies, a relatively short compartment positioned downstream of said grinding compartment and bounded on the downstream portion by a dam ring defining a central opening and on the upstream portion by a sieving means capable of retaining the grinding bodies in said grinding compartment, said short compartment being so configured to permit fluidized ground material to flow at least from the upstream grinding compartment to the short compartment, said short compartment having an intermediate plate defining upstream and downstream compartments therewithin, and at least one opening remote from the peripheral wall of the mill, said opening being positioned to correspond to the intended level of fluidized material in the upstream compartment of the short compartment and in the downstream grinding compartment, said upstream compartment of the short compartment being devoid of any lifters and said downstream compartment of the short compartment having lifting means, said lifting means being so configured as to assist in transporting the material from the downstream compartment of the short compartment into a downstream grinding compartment or out of the mill.

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**3,964,718**

**APPARATUS FOR CRUSHING MATERIAL**

**Peter A. Balistrieri, 1412 S. Park Ave., Buffalo, N.Y. 14220**

**Filed Sept. 6, 1974, Ser. No. 503,711**

**Int. Cl.² B02C 4/32**

**U.S. Cl. 241—79** **7 Claims**

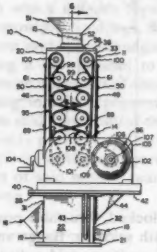
**1.** Apparatus for crushing material, comprising:

a housing having a conduit for directing an advance of said material therealong, said conduit having an inlet opening for admitting material to be crushed and having an outlet opening for discharging crushed material;

a plurality of cooperative pairs of rotatable crush rollers journalled on said housing and spaced longitudinally along said conduit, the rollers, of each of said pairs having portions arranged within said conduit and spaced operatively from one another transversely of the longitudinal

axis of said conduit to crush material passing therebetween, the rollers of any one pair arranged closer to said outlet opening being more closely spaced than the rollers of any other pair arranged further from said outlet opening;

adjustment means operatively arranged between said housing and one of said rollers for enabling adjustment of the operative spacing between the pair including such adjustable roller; said adjustment means including a disc-like



cam member rotatably mounted on said housing and provided with a plurality of circumferentially-spaced radially-extending recesses, and a holding member adapted to be received in any of such cam recesses to hold said cam member immovable at a selected angular position, said adjustable roller being journalled at an eccentric position on said roller,

whereby material advancing along said conduit may be progressively crushed between the rollers of each successively encountered pair.

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**3,964,719**

## MOBILE STONE CRUSHING PLANT

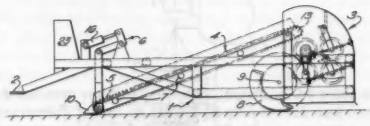
**William Whytock Hally, Les-Na-Creive, Strathmore Terrace, Alyth, Perthshire, and Thomas Pate, Jr., South Powrie Farm, Dundee, Angus, both of Scotland**

**Filed Apr. 11, 1974, Ser. No. 459,948**

**Claims priority, application United Kingdom, Apr. 18, 1973, 18724/73**

**Int. Cl.² B02C *4/08***

**U.S. Cl. 241—101.7** **11 Claims**



1. A stone crushing unit comprising two crushing zones one above the other with at least one crushing roller at each crushing zone and further crushing means at each zone co-operating with the respective roller to define at each zone a nip through which stones pass for crushing, mounting means mounting each of said rollers for positioning said rollers relative to their respective co-operating crushing means by the force of gravity directly onto said rollers, said mounting means allowing passage of uncrushable material through each of said nips through the movement of the respective roller against the force of gravity, and spring dampening means associated with each crushing roller for dampening movement of each crushing roller towards and away from its cooperating crushing means.

**3,964,720**

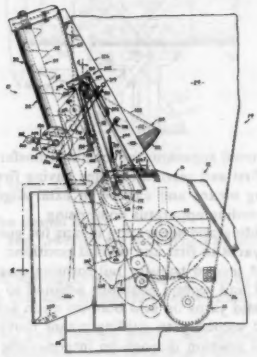
## APPARATUS FOR FEEDING MATERIALS INTO A HAMMERMILL OR THE LIKE

**Aquila D. Mast, Lancaster, Pa., assignor to Sperry Rand Corporation, New Holland, Pa.**

**Filed Apr. 17, 1975, Ser. No. 569,021**

**Int. Cl.² B02C *13/286***

**U.S. Cl. 241—186 A** **16 Claims**



1. Apparatus for feeding baled roughages, grains and other feed materials into a hammermill or the like which includes a housing having a material receiving opening defined therein, said apparatus comprising:

elongated feeding means for receiving feed materials at an upper side thereof and being mounted at one end portion to said housing adjacent a lower side of said opening therein and operable to convey feed materials into said housing through said opening;

closure means disposed adjacent said housing opening and adjacent and above said one end portion of said elongated feeding means, said closure means including a first surface portion which extends along a path near said housing opening to normally substantially close the same, said closure means being movably upwardly away from said elongated feeding means upon being engaged by feed material, such as baled roughage, as the latter is fed by said elongated feeding means toward said housing opening, said upward movement of said closure means causing its first surface portion to move upwardly along said path relative to said housing opening and thereby open a sufficient portion of said housing opening for allowing passage of said feed material into said housing through said portion of said housing opening; and

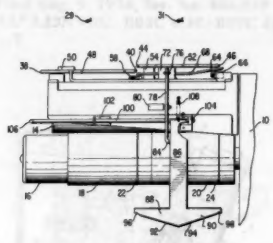
operative feeding assist means mounted in said housing at a location spaced above said one end portion of said elongated feeding means and adjacent an upper portion of said housing opening, said feeding assist means for engaging upper portions of feed material, such as baled roughage, to thereby assist the feeding thereof through said housing by said elongated feeding means.

3,964,721

## APPARATUS FOR FORMING A TRANSFER TAIL

Malcolm P. Owens; Edgar E. Barnes, and Dennis Ray Burton, all of Charlotte, N.C., assignors to Fiber Industries, Inc., Charlotte, N.C.

Filed Apr. 30, 1974, Ser. No. 465,720
Int. Cl.² B65H 54/02
U.S. Cl. 242—18 PW 6 Claims



1. An improved apparatus for forming transfer tails of a pair of yarns on first and second bobbins having first and second yarn engaging means and carried in axial alignment on the chuck of a winding apparatus comprising

a. yarn guiding and separating means for guiding first and second yarns to first and second positions;

b. first and second transfer tail forming means located at said first and second positions adapted to form transfer tails of said yarns on said bobbins upon actuation;

c. first and second yarn guiding means moveable between an initial position through an intermediate position to a final position, said first yarn engaging means being located intermediate and in a common plane with said first transfer tail forming means and said first yarn guide means, and said second yarn engaging means being located intermediate and in a common plane with said second transfer tail forming means and said second yarn guide means; and

d. actuator means for moving said yarn guide means from said initial position through said intermediate position to engage said first and second yarns with said first and second yarn engaging means and to said final position to actuate said first and second transfer tail forming means.

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3,964,722

## TRANSFER TAIL APPARATUS AND METHOD FOR VERTICAL SPINDLE WINDER

Beryl Aaron Boggs, Chester; Robert David Carr, Hopewell; Lawrence Edward Cary, Richmond; Clarence Albert Forman, Hopewell; Wayne Henry Murray, Chester; Weldon Herbert Peterson, Colonial Heights, and Everett Gray Montgomery, Chester, all of Va., assignors to Allied Chemical Corporation, Petersburg, Va.

Filed June 3, 1974, Ser. No. 475,365
Int. Cl.² B65H 54/02
U.S. Cl. 242—18 PW 13 Claims

1. An apparatus for forming a transfer tail during string-up of a winder for winding yarn on a bobbin having a flange comprising in combination

a thrustable, tail forming string-up aid,

a tail storage mechanism,

a pin at the outer edge of the outer face of said flange,

a tail cutter, and

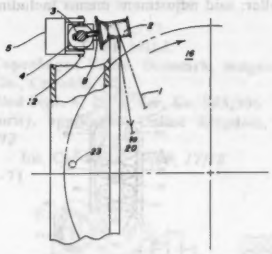
means to thrust said aid,

said aid being located adjacent to the outer edge of the periphery of said flange of said bobbin

said storage mechanism being locate adjacent to the outer face of said flange of said bobbin and inside the outer edge of the periphery of said flange

said tail cutter being located adjacent said winder, but at a distance dowstream from said aid,

said yarn passing across the inside of said bobbin flange to said string-up aid, then across the outer face of said bobbin flange, said cutter located to contact said yarn after said yarn crosses the outer face of the bobbin flange,



said aid having a locked, thrustable position holding said yarn out of contact with said pin, flange and storage mechanism, and an activated position, said activated position being located so as to cause yarn to be brought into contact with said pin and storage upon said storage mechanism as a tail, and so as to activate said tail cutter by reversal of direction of yarn travel between said pin and said cutter, said activated position also bringing about winding of said yarn on said bobbin.

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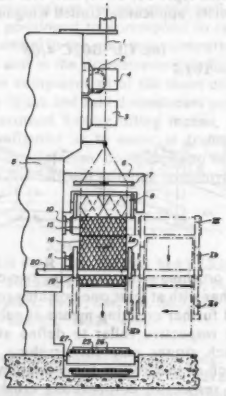
3,964,723

## AUTOMATIC SPOOL-CHANGING APPARATUS

Heinz Schippers; Karl Bauer; Erich Lenk; Manfred Mayer, all of Remscheid-Lennep, and Hans Jochen Busch, Remscheid, all of Germany, assignors to Barmag Barmer Maschinenfabrik Aktiengesellschaft, Wuppertal, Germany

Filed June 4, 1975, Ser. No. 583,849
Claims priority, application Germany, June 4, 1974, 2427016
Int. Cl.² B65H 67/04
U.S. Cl. 242—35.5 A 16 Claims



1. In a textile machine including:

a plurality of winding apparatus, disposed in a horizontal array along the front of the machine, for winding a multifilament synthetic yarn which is continuously fed to said apparatus at a constant high velocity, each said apparatus having, in a corresponding spool-changing position, a

spool holder journaled in said machine with the axis of said holder projecting from the front of said machine;

a spool conveyor mounted for horizontal movement along the machine front; and

an automatic spool changing apparatus having a gripping means movable between the conveyor and the spool-changing position of the spool holder;

the improvement:

that said conveyor is disposed in substantially the same vertical plane with, and at a level below, said spool holders, and

that said gripping means is mounted for movement along a spool-doffing path which extends forwardly of the machine front and comprises three legs, the first leg of said path extending from said spool-changing position of the spool holder, along a line parallel to the axis of said holder, forwardly to an upper out-of-the-way position, the second leg extending, in a plane perpendicular to the axis of said holder, from said upper out-of-the-way position to a lower out-of-the-way position, and the third leg extending from said lower out-of-the-way position, along a line parallel to the axis of said holder, rearwardly to a conveyor discharge zone.

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**3,964,724**

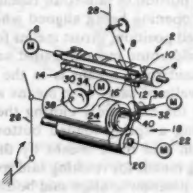
## TRAVERSE WINDING METHOD

**Don E. Fisher; Paul A. Knauff, and David Bowen, Jr., all of Pensacola, Fla., assignors to Monsanto Company, St. Louis, Mo.**

**Division of Ser. No. 798,082, Feb. 10, 1969, abandoned. This application Nov. 2, 1970, Ser. No. 85,930**

**Int. Cl.² B65H** *54/30*

**U.S. Cl. 242—43 R** **4 Claims**



1. A traverse winding method comprising the steps of:

a. traversing a yarn in a traverse plane back and forth between reversals in one zone of said traverse plane;

b. collecting the traversing yarn in a second zone of said traverse plane;

c. during said reversals, engaging said traversing yarn with a secondary traverse device between said one and said second zones whereby said yarn forms a trail angle and a trail length between said secondary traverse device and said second zone; said trail angle varying from a first given value in a first direction at the beginning of a reversal period through 90° to a second given value in the opposite direction at the end of said reversal period; and

d. decreasing said trail length during at least part of the period beginning when said trail angle becomes 90° and ending when said trail angle reaches said second value, said step of decreasing being accomplished by moving said secondary traverse device toward said second zone after said trail angle has become 90°.

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**3,964,725**

## DENTAL CHAIR

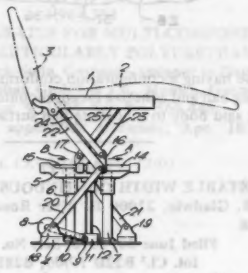
**Takahiro Matsui, and Osamu Uwamori, both of Kyoto, Japan, assignors to Kabushiki Kaisha Morita Seisakusho, Kyoto, Japan**

**Filed Apr. 5, 1974, Ser. No. 458,222**

**Claims priority, application Japan, Apr. 17, 1973, 48-43369**

**Int. Cl.² A61G** *15/00*

**U.S. Cl. 248—421** **3 Claims**



1. A dental chair, comprising:

a base;

a seat for the dental chair;

first raising and lowering means carried by said base member;

a frame member supported by said first raising and lowering means so that said frame member is raised and lowered thereby; and,

second raising and lowering means, said second raising and lowering means operative to raise and lower said seat and comprising, on each side of said chair,

a first link means having two ends and a movable joint at a point therebetween, said first link means being rotatably connected at one end thereof to said base by pivot means fixed relative to said base and rotatably connected at the other end thereof to said seat by pivot means fixed relative to said seat, and,

slidable supporting means carried by said frame for slidably supporting said movable joint such that said movable joint slides substantially horizontally along said slidable supporting means as said first raising and lower means raises and lowers said frame member, said seat being raised or lowered as said frame member is raised or lowered by an amount equal to the amount said frame member is raised or lowered plus an additional amount resulting from movement of said movable joint in said slidable supporting means;

one of said first link means being rotatably connected at one end thereof to said seat toward the rear thereof and the other of said first link means being rotatably connected at one end thereof to said seat toward the front thereof, said one of said first link means being rotatably connected to said base toward the rear thereof and said other of said first link means being rotatably connected to said base toward the front thereof, said slide members moving in opposite directions when said chair is raised or lowered.

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**3,964,726**

## BOWLING BALL HOLE FONT

**Norman D. Ott, 619 Cherry St., Lansing, Mich. 48933, and Richard D. Foster, 4250 Pinch Highway, Potterville, Mich. 48876**

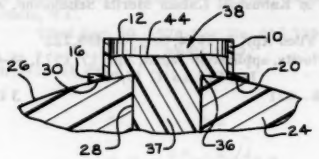
**Filed Mar. 27, 1974, Ser. No. 455,298**

**Int. Cl.² B28B** *7/00*

**U.S. Cl. 249—90** **2 Claims**

1. A font for use in the plugging of bowling ball finger holes comprising a circular annular body formed of an easily machinable rigid material having first and second open ends, a radially outwardly extending flange defined on said first end defining a base, said second end defining an opening having a

diameter equal substantially to the inner diameter of said body, a concave spherical supporting surface defined upon




said base having a configuration conforming to the surface of a bowling ball and adhesive means mounted upon said base for affixing said body to a bowling ball surface.

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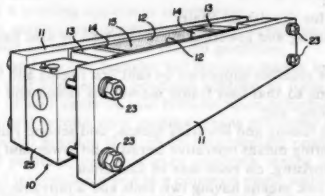
**3,964,727**

## ADJUSTABLE WIDTH CONTINUOUS CASTING MOLD

**Floyd R. Gladwin, 21000 E. River Road, Grosse Ile, Mich. 48138**

**Filed June 30, 1975, Ser. No. 591,531**
**Int. Cl.² B22D** *19/00*; **B28B** *7/02*
**U.S. Cl. 249—158** **7 Claims**




**1.** Apparatus for adjusting the width of a continuous casting mold formed of a pair of spaced apart, substantially parallel, rigid, plate-like members, forming opposed casting faces, and side members arranged between the mold members at the opposite sides thereof to provide a roughly rectangular shaped, in cross-section, open ended casting cavity for continuous casting of metal therethrough, comprising:

at least one of said side members being located a distance inwardly of the adjacent edges of the mold members, and bolt-like members extending between the mold members, between said one side member and its adjacent mold member side edges, and loosely holding the two mold members together and towards said one side member;

a spring means arranged between the bolt-like members and at least one of the mold members for normally forcing said one mold member towards the other for clamping the mold members against said one side member and for normally resisting separation of the two mold members, but permitting limited separation of the two mold members for releasing th clamping of said one side member against the resistance of said spring means;

a mounting block supported between the mold members and outwardly of said one side member and adjustable length connector members interconnecting said mounting block and said one side member;

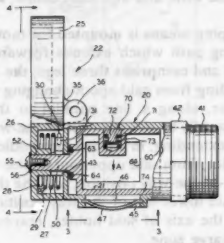
pressure members mounted upon said mounting block for engaging and for selectivly exerting a separating pressure upon the mold members for overcoming the force of the spring means and thereby releasing the side member, whereby said one side member may be adjusted inwardly or outwardly of the mold casting cavity for adjusting the width of said casting cavity and said pressure members may be released for reclamping said one side member between the mold members.

**3,964,728**

## SELF CLOSING SAFETY GATE VALVE FOR VISCOUS FLUIDS

**Frank S. Flider, Chicago, Ill., assignor to Justrite Manufacturing Company, Chicago, Ill.**

**Filed July 22, 1974, Ser. No. 490,685**
**Int. Cl.² F16K** *25/00*
**U.S. Cl. 251—183** **1 Claim**



**1.** A valve for controlling the flow of heavy viscous fluids comprising, a main housing, said main housing having a cylindrical interior chamber with circular ends and side walls extending between said ends, an end housing opening at one of said ends, a housing release opening in the wall of said cylindrical housing, rotor means located within said main housing, said rotor being cylindrical and having circular ends and side walls extending between said ends, said rotor means being rotatable between a valve closed position and a valve open position to control the flow of the fluids as a function of the position of said rotor means, a first rotor opening at one end of said rotor means in communication with said end housing opening, a rotor release opening in the side wall of said rotor means, said rotor release opening and said housing release opening being aligned when said rotor is rotated to said open position with no portion of said rotor release opening and said housing release opening being aligned when said rotor is rotated to the closed position, thrust means for exerting a lateral force pushing said rotor means against said housing release opening when said rotor means is in the closed position to force the side walls of said rotor means against the housing release opening for effectively closing the valve, said thrust means comprising a spring loaded button compressed in a blind bore within said rotor means by the side wall of said housing, rotating means for rotating said rotor means from the normally closed position to align said housing release opening and said rotor release opening to enable the flow of said fluids though said valve, and said rotating means including spring biased safety handle means for controlling the rotation of said rotor means and for automatically returning the rotor means to the normally closed position where the thrust means presses the rotor body against the housing release opening thereby sealing said housing release opening.

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**3,964,729**

## ELEVATING DEVICE FOR SNOWMOBILES

**Ronald Harlow, 261 Indian Trail, Columbiaville, Mich. 48421**

**Filed Dec. 26, 1974, Ser. No. 536,461**
**Int. Cl.² B66F** *3/00*
**U.S. Cl. 254—131** **9 Claims**

**1.** A vehicle elevating device, comprising:

a. a ground engaging base support,

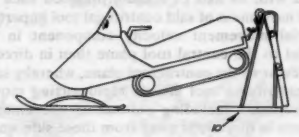
b. an upstanding support means secured to the base support, the support means comprising;

a pair of spaced apart inverted U-shaped support members, each having a first leg, a second leg and a connecting leg,

c. an over center rotatable lever pivotally connected to the second legs of the support means,

d. guide means secured to the first legs of the support means,

e. vehicle grasping means secured at one end thereof to the rotatable lever and passing over the guide means, the



vehicle grasping means including vehicle engaging means at the other end thereof,

and wherein rotation of the lever arm between an upward position and a downward position elevates a vehicle in engagement with the vehicle engaging means.

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**3,964,730**

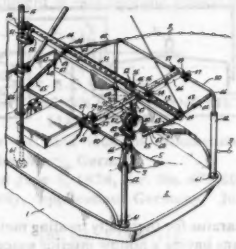
**SEINE-HAULING POWER BLOCKS**

**Lawrence E. Demmert, 1275 E. Bakerview Road, Bellingham, Wash. 98225**

**Continuation of Ser. No. 221,933, Jan. 31, 1972, abandoned, and a continuation-in-part of Ser. No. 701, Jan. 5, 1970, Pat. No. 3,643,365. which is a continuation-in-part of Ser. No. 759,693, Sept. 13, 1968, Pat. No. 3,535,811. This application Sept. 30, 1974, Ser. No. 510,733**

**Int. Cl.² A01K** *73/06*

**U.S. Cl. 254—138** **6 Claims**



**1.** A seine-hauling power block for a fishing boat, comprising a Puretic-type sole seine-hauling sheave having a peripheral groove, mobile hanger means suspending said sheave in an elevated position, power means for rotating said sheave in a predetermined direction to haul in a seine wrapped in said sheave peripheral groove, two guide rollers each having a maximum diameter much smaller than the maximum diameter of said sheave, two cantilever shafts on said hanger means lower than the axis of said sheave and mounting said guide rollers, respectively, closer to said sheave than the greatest radial depth of said peripheral sheave groove but spaced from the lower periphery of said sheave, said rollers being spaced from each other circumferentially of said sheave for engaging said guide roller with the side of the seine opposite that engaged with the sheave groove and for effecting wrapping of the seine in the sheave groove around an arc greater than the arc of wrap produced by the effect of gravity on the seine, and power means for driving at least one of said guide rollers to rotate in the direction opposite the direction of rotation of said sheave.

**6.** The method of hauling a seine by the use of an elevated Puretic-type power block having a sole power-rotated, peripherally-grooved, seine-hauling sheave, which comprises power-rotating the sheave, draping the seine in the upper portion and the downwardlymoving portion of the power-rotated sheave groove, wrapping the seine in the downwardlymoving portion of the power-rotated sheave groove around an arc greater than the arc of wrap produced by the effect of gravity on the seine by passing the downwardly-moving portion of the seine between such sheave and a guide roller having its axis lower than the axis of the power-rotated sheave and the roller being located closer to the powerrotated sheave than the depth of the sheave groove, and power-rotating such guide roller to rotate in the direction opposite to the direction of rotation of the power-rotated sheave.

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**3,964,731**

**MIXING APPARATUS FOR MULTI-COMPONENT PLASTICS, PARTICULARLY POLYURETHANE**

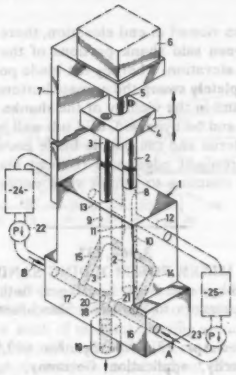
**Rudolf Ernst, Munich-Solln, Germany, assignor to Firma Elastogran Maschinenbau GmbH & Co., Munich, Germany**

**Filed Apr. 9, 1975, Ser. No. 566,446**

**Claims priority, application Germany, Apr. 10, 1974, 2417513**

**Int. Cl.² B01F** *5/00, 15/02*

**U.S. Cl. 259—4 R** **4 Claims**



**2.** A mixing apparatus for multi-component plastics such as polyurethanes, including a housing providing a mixing chamber with component inlet ports, inlet conduits for supplying components from component reservoirs to the inlet ports under pressure, bypass conduits for recirculating the components to the reservoirs, a valve piston movable to and fro in the mixing chamber and opening or closing the inlet ports as the piston moves through mixing chamber purging and return strokes, means driving the piston through purging and return strokes, the housing including a separate bore communicating the inlet conduits with the bypass conduits, and a plunger driven by the driving means and movable in the bore parallel to and in unison with the piston, the plunger having return flow grooves oriented to provide return flow communication for the respective conduits through the bore when the piston blocks the inlet ports, and the plunger preventing return flow of components through the bore when the inlet ports are unblocked by the piston.

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**3,964,732**

**APPARATUS FOR MIXING MOLDING SAND**

**Nelson Hartley, Towson, Md., assignor to Hartley Controls Corporation, Neenah, Wis.**

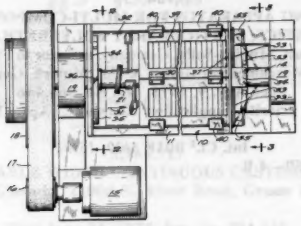
**Filed Dec. 30, 1974, Ser. No. 537,817**

**Int. Cl.² B01F** *7/06*

**U.S. Cl. 259—10** **11 Claims**

**1.** A molding sand mixer comprising an elongated tub having an arcuate bottom, an elongated shaft extending axially

within the tub, a series of paddles mounted on the shaft and extending radially toward the tub wall, power means for rotating said shaft, said paddles having blade and shank portions, at least said blade portions being disposed at an oblique angle to the tub axis to advance sand along the tub when the shaft rotates, the blade portions of the paddles having a greater circumferential extent than the shank portions, the aggregate circumferential extent of said blade portions at least almost filling the space around the periphery of said arcuate bottom



of the tub when viewed in end elevation, there being substantial gaps between said shank portions of the paddles when viewed in end elevation, whereby the blade portions will substantially completely sweep the arcuate bottom of the tub, but some of the sand in the vicinity of the shanks may be missed by the shanks and be bypassed, said tub wall being lined with a resilient material and the paddle blade portions being provided with a resilient edge, said resilient material and said resilient edge coacting to inhibit sand encrustation of said wall.

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**3,964,733**

## MIXER FOR MOLDING SAND

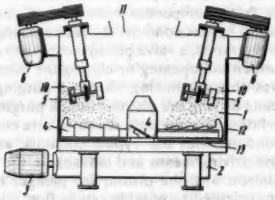
**Rudolf Tutzschky, and Fritz Lenzinger, both of Karlsruhe, Germany, assignors to Badische Maschinenfabrik GmbH, Germany**

**Filed Apr. 15, 1974, Ser. No. 460,998**

**Claims priority, application Germany, Apr. 13, 1973, 2318692**

**Int. Cl.[2] B01F 7/00, 7/04**

**U.S. Cl. 259—103** **29 Claims**



**1.** Mixer for molding sand and the like comprising:

a stationary mixer bowl having a central bowl axis,

a central tool for imparting rotational movement to the contents of the bowl with respect to the bowl axis,

central tool drive means for driving said central tool rotatably about said bowl axis,

at least one centrifugal tool disposed eccentrically to the bowl axis for imparting mixing effect to said contents as said contents are rotated by said central tool,

centrifugal tool drive means for rotatably driving each of said at least one centrifugal tools,

and centrifugal tool support means for supporting each of said at least one centrifugal tools at a fixed position with respect to said bowl and such that each of said at least one centrifugal tools is in facing spaced relationship with respect to the central tool plane within which said central tool rotates,

wherein each of said at least one centrifugal tools is positioned with its axis of rotation inclined such that rotational movement of said centrifugal tool imparts a greater material movement velocity component in directions parallel to the central tool plane than in directions perpendicular to the central tool plane, whereby said at least one centrifugal tool effects rapid mixing movement of said contents including substantial movement of said contents in directions away from those side wall portions of said mixer bowl which are closest to the respective centrifugal tool.

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**3,964,734**

## APPARATUS FOR THERMALLY TREATING METAL COMPONENTS

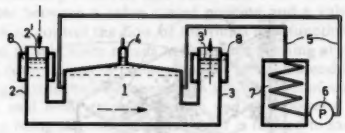
**Alfred Kreidler, Postfach 367, CH-8053, Zurich, Switzerland, and Klaus Viessmann, Friedrich-Ebertstr 110, D-7014 Kornwestheim, Germany**

**Filed Aug. 10, 1973, Ser. No. 387,278**

**Claims priority, application Germany, Aug. 11, 1972, 2239552**

**Int. Cl.[2] C21D 1/50**

**U.S. Cl. 266—133** **18 Claims**

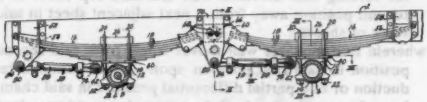


**1.** In an apparatus for thermally treating metal components, enclosure means having a hollow interior space for containing in said space a liquid at an elevated temperature in which the metal components are thermally treated, inlet means connected to and communicating with the interior of said enclosure means for introducing components to be treated into the interior space of said enclosure means, outlet means spaced from said inlet means and connected to and communicating with the interior of said enclosure means for discharging components out of the interior space of said enclosure means, said inlet and outlet means forming the only passages through which the components can travel into and out of the interior of said enclosure means and both having interior hollow spaces for receiving liquid extending completely across the latter spaces for preventing communication between the interior spaces of said enclosure means and the outer atmosphere, said inlet and outlet means both extending to an elevation higher than the hollow interior space in said enclosure means where the treating liquid is located, said enclosure means having a wall which at least substantially closes off the entire interior of said enclosure means except for said inlet and outlet means, and conveyer means situated in said enclosure means for conveying components to be treated along a predetermined horizontal path in a treating liquid contained in said hollow interior space of said enclosure means with said predetermined path being situated above the bottom of the treating liquid and having a predetermined length, and said enclosure means providing for the treating liquid a a depth which is less than the length of said path.

## 3,964,735
## TORSION BAR ADAPTOR FOR VEHICLE SPRINGS

Oliver L. Wright, P.O. Box 206, Lincoln, Mo. 65338, and Wilbur D. Wright, P.O. Box 81, Lincoln, Mo. 65338

Filed Mar. 3, 1975, Ser. No. 554,570
Int. Cl.² B60G 11/44
U.S. Cl. 267—25 6 Claims



1. For use in converting a vehicle spring suspension system to include torsion bars, said system including an elongated spring supporting the vehicle chassis at its ends and supported intermediate its ends on the generally planar top surface of a spring mount welded to an axle housing of said vehicle which carries rotatable ground-engaging wheels, and including suitable clamping means for affixing said spring against said top surface of said mount, and said torsion bars each constituting a rigid link vertically pivoted at one end to said vehicle chassis and adapted to be vertically pivoted to said spring mount at its opposite end, said mount not normally being provided with connections for said opposite end of said torsion bar, an adaptor comprising a planar plate portion adapted to be inserted between said axle spring mount and said spring, and to be secured therebetween by said clamping means, and extending portions integral with said plate portion and providing means for pivotal attachment of said opposite torsion bar end to said adaptor.

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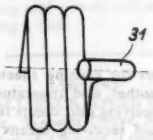
## 3,964,736
## HELICAL EXTENSION SPRING AND METHOD OF MAKING SAME

Joachim Walter Gerhard Huhnen, Blankensteinstr. 24, D-7141 Steinheim, Murr, Germany

Filed June 3, 1974, Ser. No. 475,805
Claims priority, application Germany, June 1, 1973, 2327796
Int. Cl.² F16F 1/12
U.S. Cl. 267—166 7 Claims




1. A helical tension spring having a spring body and two preformed terminal eyelets formed integrally therewith, the free ends of the eyelets contacting the respective end coils of the spring body, each such eyelet exhibiting a localized outward bend in a substantially axial plane of the spring for exerting an initial axial pre-stress force which has to be overcome in order to lift the eyelets off from the adjacent end coils of the spring body, such initial axial pre-stress force being larger than a force normally applied at the eyelet during the use of the spring, which force causes in the spring body a torsion stress which is on the order of a tenth of the tensile strength of the spring wire.

## 3,964,737
## BELLEVILLE SPRING

Michael A. Schober, Palatine, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Aug. 23, 1974, Ser. No. 500,212
Int. Cl.² F16F 1/34
U.S. Cl. 267—161 6 Claims

1. An improved Belleville spring formed of a low carbon steel having an original carbon content not higher than 0.40% carbon and provided with a case hardened surface to a depth in the range of 0.010 to 0.040 inches and having residual compressive stresses in the surface of the spring, said spring surface having a carbon content of at least approximately twice the carbon content at the core of the spring.

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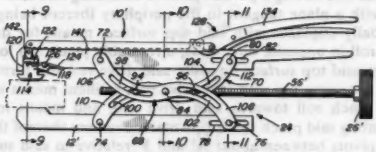
## 3,964,738
## CLAMP

Walter L. Owen, Rte. 2, Box 540, Gridley, Calif. 95948

Continuation-in-part of Ser. No. 473,292, May 24, 1974, abandoned. This application Aug. 6, 1975, Ser. No. 602,308
Int. Cl.² B25B 5/12
U.S. Cl. 269—221 12 Claims



8. A clamping device for workpieces comprising a pair of jaws, a pair of links, means pivotally connecting each of said links to the jaws, each of said links having arcuate sections of opposite curvature, means pivotally interconnecting said links between the arcuate sections, a pair of nut elements, pin and slot connecting means interconnecting said nut elements with overlapping arcuate sections of said links, and actuating screw means threadedly engageable with said nut elements.

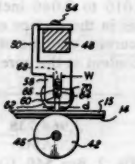
10. A clamping device for workpieces comprising a pair of spaced apart opposing jaws, force multiplying means interconnecting the jaws for relative displacement of said jaws toward and away from each other, a work engaging element movably mounted on one of the jaws in confronting relation to the other of the jaws, actuating means operatively connected to said work engaging element for displacement thereof between retracted and clamping positions, said one jaw and said work engaging element including first coacting means supporting said element from said one jaw for guided movement of said element relative to said one jaw toward and away from the other jaw and second coacting abutment means establishing a limit position of movement of said element relative to said one jaw away from the other jaw, disconnectable spring means operatively connected between said element and said one jaw yieldingly biasing said element toward said limit position, said first coacting means including relatively telescoped portions of said element and said one jaw readily disengageable with each other upon disconnection of said spring means and movement of said element, relative to said first jaw, in excess of a predetermined amount away from said limit position and toward said other jaw, said one jaw including opposite side outwardly opening recesses extending toward and away from said other jaw and opening endwise outwardly toward said other jaw, said element including a pair of spaced furcations slidably and guidingly received in said recesses, said recesses and furcations comprising said first coacting means and defining said relatively telescoped portions.

3,964,739

## SELF-ALIGNING AND SELF-LEVELING PINCH ROLL FOR MAGNETIC CARD TRANSPORT SYSTEM

Valentine Garcia, San Jose, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 30, 1974, Ser. No. 537,794
Int. Cl.² B65H 5/06
U.S. Cl. 271—3 6 Claims



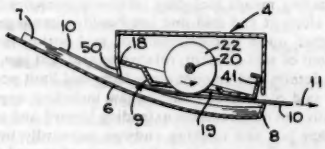
1. A card transport system comprising a card support member having a top surface, stationary guide means extending along one longitudinal edge of said support member and extending above said top surface, an opening in said member extending through said top surface, a drive roll supported for rotation about an axis which is generally parallel to said top surface and having a portion thereof extending into said opening with a plane tangent to the periphery thereof being substantially coplaner with said top surface, means for driving said roll in opposite directions, a rotatable pinch roll located above said top surface opposite said drive roll and forming a card receiving nip with said drive roll, resilient means urging said pinch roll towards said drive roll, and means loosely mounting said pinch roll for pivotal movement thereof that its axis pivots between about ½° and 3° relative to said support member in opposite directions from a line substantially perpendicular to said guide means about a vertical axis substantially normal to its axis of rotation and substantially normal to said top surface, said means loosely mounting said pinch roll comprising a stationary bracket located above said top surface and having a pair of spaced members extending toward said surface, an opening in each of said spaced members, a shaft, said pinch roll being located between said members and rotatably connected to said shaft, said shaft extending between said spaced members and having a respective portion thereof extending into a respective one of said openings, the width of said opening being of a dimension which is larger than the width of said shaft extending therein to allow relative movement therebetween to permit said pivotal movement of said pinch roll such that its axis pivots between about ½° and 3° in opposite directions from a line substantially perpendicular to said guide means about said vertical axis.

3,964,740

## SHEET-FEEDING APPARATUS

Reginald T. Lamb, 1491 Jopar Ave., Los Altos, Calif. 94022

Filed Jan. 13, 1975, Ser. No. 540,314
Int. Cl.² B65H 3/06, 3/08, 9/16
U.S. Cl. 271—11 21 Claims



1. A sheet-feeding apparatus comprising: means forming a vacuum chamber having at least one movable wall;

an aperture disposed within said movable wall, said movable wall being freely movable to a first position adjacent a top sheet of a stack of sheets;

means for evacuating air from said chamber and drawing said top sheet into contact with said movable wall about said aperture and sealing said aperture, said sealing of said aperture causing a partial differential pressure on opposite surfaces of said movable wall and said top sheet for forcing said movable wall and said top sheet to a second position away from a next adjacent sheet in said stack of sheets;

wherein said movable wall moves freely from said second position to said first position upon a predetermined reduction of said partial differential pressure in said chamber when said top sheet is removed a predetermined amount from said aperture;

means for translating said top sheet in a direction parallel to the longitudinal axis of said stack of sheets; and

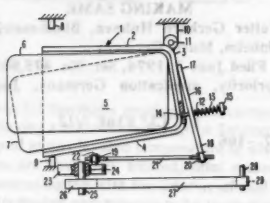
wherein said translating means comprises means forming a rolling means disposed within said chamber for contacting said top sheet when said top sheet has been moved from said first position to said second position and means coupled to said rolling means for rotating said rolling means and translating said top sheet from said second position to a predetermined third position.

3,964,741

## TRANSLATABLE STACKER APPARATUS

Elmer Leroy Bob Kroeker, Round Rock, Tex., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed June 27, 1975, Ser. No. 590,762
Int. Cl.² B65H 33/08
U.S. Cl. 271—213 9 Claims



1. An apparatus for causing sheets to be stacked offset relative to one another, said apparatus comprising:

a. means for receiving said sheets fed from a sheet feeding apparatus, said receiving means being translatable between a first position and a second position;

b. means for holding said receiving means in said first position;

c. means for releasing said holding means;

d. means for biasing and urging said receiving means toward said second position when said receiving means is in the vicinity of said first position; and

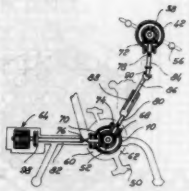
e. means, upon said holding means being released by said releasing means and after said receiving means has been urged away from said first position by said biasing and urging means, for causing said receiving means to be translated to said second position, and including means for causing said receiving means to be translated from said second position to said first position after said receiving means has been translated to said second position.

3,964,742

## PHYSIOLOGICAL ACTIVE AND PASSIVE EXERCISING APPARATUS

Guido Carnielli, 28, Piazzale Luigi di Savoia, Milan, Italy

Filed Oct. 16, 1974, Ser. No. 515,422
Claims priority, application Italy, Oct. 17, 1974, 30220/74
Int. Cl.² A63B 21/00
U.S. Cl. 272—73 8 Claims



1. An apparatus for the active and passive exercising of a user, comprising a bicycle frame assembly including a seat and a forward and a rear upstanding tubular component, said frame being selfstanding and having a vertical plane; a pair of crank pedals on said frame in a lower region thereof and rotatable about a horizontal first axis, said crank pedals including means for braking their rotation; a pair of crank handles on said frame spaced upwardly of said crank pedals and being rotatable about a horizontal second axis which is in substantial parallelism with said first axis; means for independently adjusting the vertical and horizontal relative orientation of said seat and said crank handles with respect to said crank pedals so as to determine the body attitude of a user positioned on said seat, said adjusting means including forward and rear tubular members respectively connected with said crank handles and said seat and being respectively slidingly received within said forward and rear tubular components of said frame for respectively adjusting the vertical and horizontal position of said crank handles and said seat in said vertical plane, and pivotable members mounted on said forward and rear tubular members operative for respectively adjusting the horizontal orientation of said crank handles and said seat; means for driving said crank handles and said crank pedals for passively exercising a user, said means for driving including a power unit, first means for rotatably connecting said power unit, said crank handles and said crank pedals with each other, and second means for permitting universal movement of said crank pedals with respect to said crank handles, said second means including a universal joint; and means for selectively decoupling said power unit and said crank pedals for actively exercising a user.

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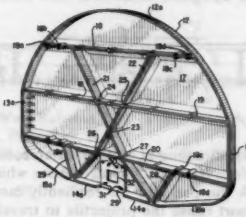
3,964,743

## BASKETBALL BACKBOARD STRUCTURE

Peter W. Salsich, Sr., Webster Grove, Mo., assignor to Playground Corporation of America, Long Island City, N.Y.

Filed June 24, 1975, Ser. No. 589,766
Int. Cl.² A63B 63/02
U.S. Cl. 273—1.5 R 10 Claims

1. In a basketball backboard of cast material having a planar play/rebound surface on one side and a reverse surface reinforced by a plurality of projecting ribs integrally cast therewith projecting from said reverse surface, the improvement wherein said ribs comprise a central generally horizontal rib and upper and lower ribs parallel thereto and defining together with said central rib generally vertically equal parts of the reverse side of said backboard, two diagonal ribs each conjoined with the upper rib at points equi-distant from edge portions of the backboard, each diagonal rib crossing the other centrally of the backboard and extending thereafter to the lower edge of said backboard, each diagonal rib being conjoined with said central and lower horizontal ribs such that



their lateral rigidizing effect is transmitted particularly throughout the central part of the play/rebound surface.

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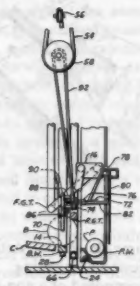
3,964,744

## BOWLING PIN AND BALL SORTING APPARATUS

Darwin D. Sonnenberg, Rte. No. 1, Hamler, Ohio 43524

Filed July 7, 1975, Ser. No. 593,657
Int. Cl.² A63D 5/02
U.S. Cl. 273—43 E 7 Claims



6. A striker bar for bowling balls, comprising:
a bracket having an abutment surface for fastening to the frame of an automatic pin setting machine, a stub shaft having a centerline extending forwardly and downwardly at an angle relative to said abutment surface, a drive pulley constructed and arranged for rotation in a plane that is perpendicular to said stub shaft centerline, a plastic striker bar having inner and projecting ends and the inner end of which is secured to said drive pulley at an angle wherein the locus of rotation of the projecting end of said striker bar is positioned axially forwardly of its inner end, and whereby rotation of said drive pulley rotates said striker bar in a generally conical path.

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3,964,745

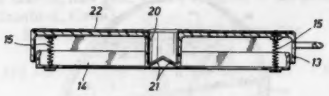
## SPRING MOUNTED PITCHING DECK AND PROJECTILE FOR IMPACTING THEREON

Andrew L. Ogg, 801 Tanglewood, Bryan, Tex. 77801

Filed Feb. 24, 1975, Ser. No. 552,692
Int. Cl.² A63B 71/00
U.S. Cl. 273—95 R 8 Claims

1. A game apparatus comprising:
a horizontal upper frame structure affixed to a lower support with resilient mountings, said upper frame structure having a flat upper surface with a target area in the approximate center thereof;
a pad affixed to the flat upper surface of said frame structure, said pad having surface frictional characteristics closely approximating a dirt surface, and a space in prox-

imity to the target area of said upper frame support member; and




a projectile for directing at said target area, said projectile having surface frictional characteristics which in combination with the pad and the resiliently mounted upper frame support cause the projectile to travel a minimum distance after impacting the pad.

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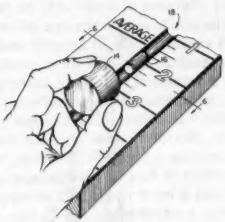
**3,964,746**
**MAGNETIC GAME DEVICE**

**Ronald L. MacMurdo, 931 Southern Artery, Quincy, Mass. 02169**

**Filed June 9, 1975, Ser. No. 584,864**
**Int. Cl.² A63F 9/00**
**U.S. Cl. 273—108** **9 Claims**



1. A magnetic game device for determining the skill of a player, said game device comprising:

a. a game board composed of a non-magnetic material, said game board formed with a channel; and

b. a pair of magnetically cooperating playing pieces, one of said playing peices composed of a magnetized material, the other of said playing pieces composed of a magnetically responsive material, said playing pieces slidably received within said channel;

c. one of said playing pieces constrained for movement within said channel along a longitudinal axis thereof, said one playing piece moved along said channel by the player maneuvering the other of said playing pieces relative to said one playing piece while said playing pieces are disengaged, a portion of said one playing piece and a portion of said other playing piece disposed in a common, substantially horizontal plane.

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**3,964,747**
**GAME APPARATUS**

**Ernest Lynn Balmforth, 515 E. 3400 North, Provo, Utah 84601**

**Filed Feb. 10, 1975, Ser. No. 548,568**
**Int. Cl.² A63F 3/02**
**U.S. Cl. 273—131 AB** **7 Claims**

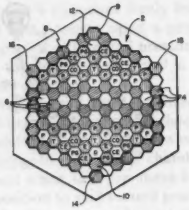
1. A game for two or three players comprising

a game board including a hexagonal playing area having a plurality of contiguous, uniformly distributed hexagonal playing spaces thereon, each of the six sides of the playing area composed of a fixed number of playing spaces to form an outer row of spaces, each playing space including one of three indicia such that no two adjacent spaces have the same indicia, said game board further including markings to distinguish the outer row of playing spaces from the remaining playing spaces interior thereto,

three sets of playing pieces, each including indicia corresponding to a different one of said three indicia,

whereby two of the sets of playing pieces are positioned on and moved among the said interior playing spaces when two players use the apparatus, and the three sets of playing pieces are positioned on and moved among all the playing spaces when three players use the apparatus, and

wherein each set of playing pieces includes a plurality of subsets, each of which includes a number of different playing pieces having different moving capabilities, said different playing pieces of a subset having a common feature identifying common type moves on the playing area of the board which may be made with such pieces.



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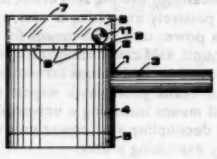
**3,964,748**
**MALLET GAME**

**David C. Harvey, Jr., 1801-12th St., Phenix City, Ala. 36867**

**Filed Apr. 28, 1975, Ser. No. 572,461**
**Int. Cl.² A63F 7/04**
**U.S. Cl. 273—138 R** **1 Claim**



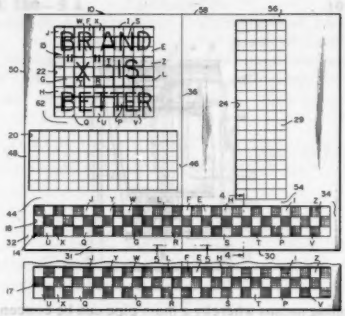
1. A mallet-like device for playing a game of chance comprising, in combination: a mallet-head of elongated substantially cylindrical outward shape having flat circularly shaped enclosed ends and including a central section of solid material, a lower section of resilient material firmly affixed thereto, and a hollow open-space portion at the upper end of said central section and having a flat imperforate clear transparent top surface thereon; a flat scoring face having nine equi-spaced ball-receiving indentures therein, arranged in an outwardly square formation firmly positioned within and delineating the bottom of said open-space upper portion and viewable through the transparent upper surface thereof; a handle firmly attached to said central section of said mallet-head and extending outwardly normal therefrom; and a ball freely movable within said open-space upper portion of said mallet-head and viewable through the transparent top surface thereof.

3,964,749

## PENTOMINO PUZZLES

William Kent Wadsworth, 876 E. 900 North No. 15, Provo, Utah 84601

Filed Apr. 10, 1970, Ser. No. 27,312
Int. Cl.² A63F 9/10
U.S. Cl. 273—157 R 1 Claim



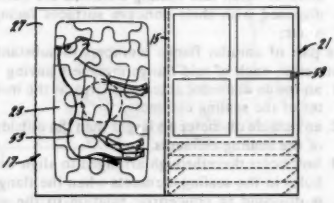

1. Two distinguishable sets of pentomino pieces, each set comprising 18 one-sided pentominoes, each pentomino in the set being different from all the other pentominoes in the set and having on one side alternate squares of different appearances capable of being arranged in a rectangle of 3 × 30 squares in a perfect checkerboard pattern, in which said pieces of each set are capable of being arranged in the same relation to each other in a rectangle of 3 × 30 squares in perfect but opposite checkerboard patterns.

3,964,750

## JIGSAW PUZZLE PAINT SET

Lyman J. Brown, LaGrange, Ill., assignor to Bates Printing Specialties, Inc., Cicero, Ill.

Division of Ser. No. 521,949, Nov. 8, 1974, abandoned. This application July 3, 1975, Ser. No. 592,928
Int. Cl.² A63F 9/10
U.S. Cl. 273—157 R 4 Claims



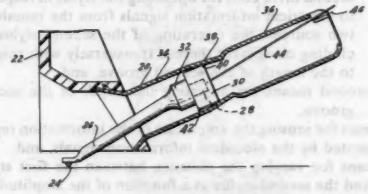

1. An educational toy including:
an elongated rectangular paperboard blank divided by laterally extending lines of weakness into three generally equal sized panels, including a center panel with an end panel on each side thereof, with said end panels being foldable over said center panel,
one of the end panels having a jigsaw puzzle die-cut therein with said puzzle being at least partially surrounded by an uncut peripheral border of said panel,
said jigsaw puzzle containing panel being folded over and adhered to said center panel by an adhesive applied to said panels in the area of said peripheral border,
an aperture formed in said center panel and aligned with said jigsaw puzzle portion of said end panel when said panels are folded over and adhered together,
a plurality of water soluble color containing areas formed on said other end panel, and
a portion of said color containing end panel subdivided by perforations into removable elongated strips of paperboard.

3,964,751

## PHONOGRAPH CARTRIDGE REPLACEABLE STYLUS ASSEMBLY

Paul Vitale, West Babylon, N.Y., assignor to Pickering & Company, Inc., Plainview, N.Y.

Filed July 31, 1975, Ser. No. 600,815
Int. Cl.² G11B 3/02
U.S. Cl. 274—37 4 Claims



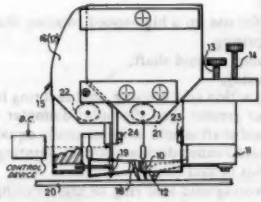

1. A phonograph cartridge stylus assembly comprising: a housing; a nonmagnetic tube affixed to said housing, said tube having a forward end, a rear end extending outwardly away from said housing; a forward section extending rearwardly from said end, a rear section extending forwardly from said rear end, and an intermediate section interposed between said forward and rear sections and said intermediate section tapers rearwardly and radially inwardly; a nonmagnetic stylus arm extending through said tube forward end, said arm having a forward end outside said housing and a rear end within said tube; a stylus tip mounted to said arm forward end; and elastomeric damper positioned within said tube supporting said arm rear end, said damper comprising a cylindrical member having a forward edge and a rear edge and only said damper rear edge engages said tube tapered section the other of said edges being free of said tube; and a magnetic member positioned within said tube secured to said arm and adapted to move therewith.

3,964,752

## METHODS AND DEVICES FOR RECORDING, ENGRAVING AND REPRODUCING MODULATED INFORMATION IN TETRAPHONY

André Marie Bernard Charlin, 119 Avenue Emile Zola, 75015 Paris, France

Filed Dec. 19, 1973, Ser. No. 426,116
Claims priority, application France, Dec. 19, 1972, 72.45329
Int. Cl.² G11B 3/04
U.S. Cl. 274—46 R 7 Claims




5. A device for tetraphonically engraving a microgroove disk with information from four separate sources of electrical

information signals, the signals varying at least in response to the magnitude of the information, the device comprising

first means for cutting a groove in the disk including

a first sterophonic recording stylus,

first drive coils for operating the stylus in response to electrical information signals from the two of the sources, the operating of the first stylus including movement thereof transversely with respect to the length of the first groove, and

first means for adjusting the depth of the first groove,

second means for simultaneously cutting a second groove adjacent and parallel to the first groove in the disk including

a second sterophonic recording stylus positioned at a predetermined mean distance from the first stylus in a direction transverse to the length of the grooves, second drive coils for operating the stylus in response to electrical information signals from the remaining two sources, the operating of the second stylus including movement thereof transversely with respect to the length of the second groove, and

second means for adjusting the depth of the second groove,

means for sensing the amplitude of the information represented by the electrical information signals, and

means for varying the distance between the first stylus and the second stylus as a function of the amplitude of the information being sensed by the sensing means, the distance being varied greater and less than the predetermined mean distance between the first stylus and the second stylus.

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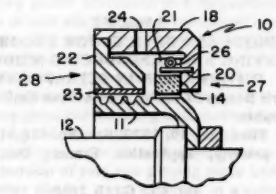
## 3,964,753

## CONTROLLED APERTURE SEAL

**Arnold E. Junker, Bridgeport, Conn., and Anthony J. Massaro, St. Marys, Pa., assignors to Avco Corporation, Stratford, Conn.**

**Filed Jan. 9, 1975, Ser. No. 539,621**
**Int. Cl.² F16J *15/30***
**U.S. Cl. 277—26** **15 Claims**




1. A seal for use on a high-speed rotating shaft, the combination comprising:

a seal runner on said shaft;

a seal housing;

a seal ring within said housing, said seal ring having an inner diameter greater than the outer diameter of said runner when said shaft is cold and essentially equal to the diameter of said runner during normal operating conditions;

a radial slot in said ring;

means pivoting said seal ring to said housing through said slot for permitting radial and pivotal movement of said ring;

a radial fracture in said ring; and

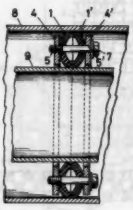
means retaining said seal ring within said housing.

## 3,964,754

## DEVICE FOR SEALING THE END OF SHEATH PIPE

**Masayo Murai, Kawasaki, and Hiroki Monno, Tokyo, both of Japan, assignors to Nishiyama Gomu Kabushiki Kaisha, Tokyo, Japan**

**Filed May 19, 1975, Ser. No. 578,992**
**Int. Cl.² F16L *21/04*; F16J *15/00***
**U.S. Cl. 277—101** **2 Claims**




1. Sealing means whereby a main pipe can be concentrically supported inside a sheath pipe that has an inside diameter substantially larger than the outside diameter of the main pipe, and whereby the main pipe is protected against vibration and the like imparted to the sheath pipe and entry of foreign matter into the space between the pipes is prevented, said sealing means comprising:

A. a pair of annular sealing elements of resiliently yieldable material, each of said sealing elements

1. being substantially cup-shaped in cross section to have

a. a concave surface that faces in one axial direction and terminates at substantially coplanar inner and outer edges of the sealing element and

b. a convex surface that faces in the opposite direction,

2. each sealing element when in relaxed condition having

a. an inside diameter to loosely fit around a main pipe and

b. an outside diameter to loosely fit inside a sheath pipe, and

3. each sealing element having a plurality of circumferentially spaced bolt holes therethrough, the bolt holes in the two sealing elements being located to align with one another when said sealing elements are concentrically disposed with their concave surfaces facing one another;

B. a pair of annular flange members of substantially rigid material, each of said flange members having

1. an inside diameter at least as large as the inside diameter of the sealing elements,

2. an outside diameter no larger than the outside diameter of the sealing elements, and

3. bolt holes therethrough arranged to align with the bolt holes in the sealing elements when the flange member is disposed in concentric relation to the sealing elements;

C. threaded means on one of said flange members cooperable with bolts received in its bolt holes; and

D. a plurality of bolts, each extending through aligned bolt holes in both flange members and both sealing elements and holding them in concentric relation with said inner and outer edges on the two sealing elements respectively engaging one another and with the flange members overlying the opposite convex surfaces of the sealing elements, said bolts

1. having threaded shanks engaged with said thread means on said one flange member and

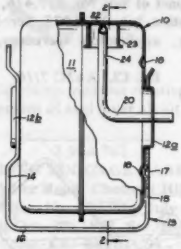
2. having heads overlying the other flange member

so that tightening of said bolts resiliently deforms the sealing elements in axial compression and thus expands them radially inwardly and outwardly.

## 3,964,755
## LIQUID FUEL SUPPLY SYSTEMS

Frederick Thomas Riddy, 187 Marsh Lane, Erdington, Birmingham 23, Warwickshire, England

Filed Dec. 26, 1974, Ser. No. 536,618
Claims priority, application United Kingdom, Jan. 17, 1974, 2321/74
Int. Cl.² B65D 25/00
U.S. Cl. 280—5 A 10 Claims

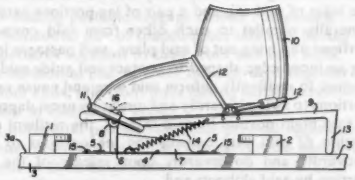


1. An auxiliary fuel supply device comprising structure defining a reservoir with an inlet and an outlet for forming an operatively enclosed connection leading from a main fuel supply to a fuel consuming device by way of the reservoir in use, and means permitting selective angular movement of at least the part of said structure which defines said outlet between a main feed position at which the outlet is positioned in an upper region of the reservoir and a reserve feed position at which said same outlet is positioned in a lower region thereof.

## 3,964,756
## SKI BINDING

Walter Mory, Peintenstrasse 5, A-9800 Spittal, Drau, Austria

Filed May 14, 1974, Ser. No. 469,811
Claims priority, application Austria, May 15, 1973, 4226/73
Int. Cl.² A63C 9/00
U.S. Cl. 280—614 5 Claims

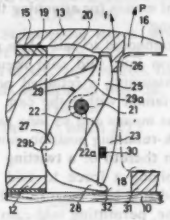


1. In a ski binding adapted to be mounted on the upper surface of a ski and to hold a shoe on the ski, the shoe having a sole with a tip and therebehind a portion supporting the ball of a foot of a skier, the binding comprising a plate for supporting the shoe sole and having two ends, and a pivot extending transversely of, and substantially parallel to, the upper ski surface, one of the plate ends associated with the tip of the sole being pivotally mounted on the transversely extending pivot, and a flange extending transversely of the plate and projecting downwardly from the plate in the region of the other end for support on the upper ski surface: a vertically extending part mountable on the upper ski surface and carrying the pivot at an upper end thereof, and means for affixing the shoe to the plate so that the tip projects forwardly of the one plate end and the shoe sole portion supporting the ball of the foot of the skier is in substantially vertical alignment with the pivot, the vertical extension of the binding part being about equal to the distance of the tip of the shoe sole from the binding part.

## 3,964,757
## HEEL HOLD-DOWN MECHANISM FOR SAFETY SKI BINDINGS

Brigitte Sittmann, Stuttgart, Germany, assignor to Vereinigte Baubeschlagfabriken Gretsch & Co. GmbH, Germany

Filed Aug. 8, 1974, Ser. No. 495,910
Claims priority, application Germany, Aug. 9, 1973, 2340416
Int. Cl.² A63C 9/08
U.S. Cl. 280—626 28 Claims



1. A heel hold-down mechanism for safety ski bindings comprising:

housing means,

heel hold-down means supported for movement with respect to said housing means between a heel hold-down position in engagement with a ski boot heel and a heel release position,

resiliently biased movable detent means guided at said housing means for movement along a predetermined path,

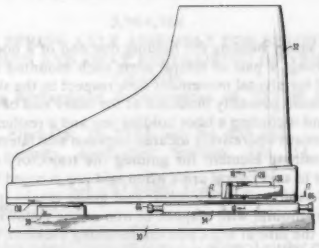
and spur means in the form of a lever pivotally supported at said heel hold-down means, said spur means including a spur element engageable with a ski boot heel during placement of a ski boot thereon with said heel hold-down means in said heel release position,

wherein said detent means is engageable with a cam surface of said spur means to effect transfer of forces and movement between said housing means and said heel hold-down means.

## 3,964,758
## SKI BINDING

James A. Kent, 3424 62nd Ave. SW., Seattle, Wash. 98116

Filed Aug. 21, 1974, Ser. No. 499,540
Int. Cl.² A63C 9/086
U.S. Cl. 280—613 21 Claims



1. A ski binding comprising:

a. a ski assembly adapted for attachment to a ski and including:
  i. housing means having an opening therein;
  ii. a cam member positioned within the opening of said ski assembly housing means and having a slot therein adapted to receive a hook, said cam member rotatable within the opening of said ski assembly housing means between a hook-retaining position and a hook-releasing position;
  iii. first bias means for restraining said cam member from rotating from the hook-retaining position to the hook-releasing position; and
  iv. second bias means for restraining a hook within the cam member slot from removal therefrom; and
b. a boot assembly including:
  i. a plate member
  ii. attachment means for attaching the plate member to a ski boot; and
  iii. a hook connected to said plate member and adapted for insertion into said cam member slot; said hook normally assuming a retained position in which said hook is retained within the cam member slot by said second bias means and so long as said cam member is in the hook-retaining position; said hook in response to application thereto of a twisting force in a horizontal plane, applying a force to said cam member to act against said first bias means until said first bias means is overcome, permitting said cam member to rotate to the hook-releasing position to release said hook from said ski assembly; said hook, in response to application thereto of a twisting force in a vertical plane applying a force to said second bias means until said second bias means is over-come, releasing said hook from said ski assembly.

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**3,964,759**

## SKI BINDING FOR SKI BOOT

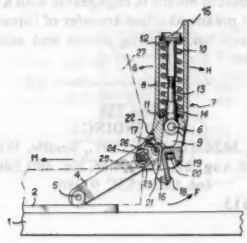
**Georges Pierre Joseph Salomon, Annecy, France, assignor to Etablissements Francois Salomon et Fils, Annecy, France**

**Filed Mar. 7, 1975, Ser. No. 556,439**

**Claims priority, application France, Mar. 14, 1974, 74.08717**

**Int. Cl.² A03C 9/08**

**U.S. Cl. 280—626** **10 Claims**



1. A safety binding for holding one end of a boot on a ski, comprising: a pair of lateral arms each mounted at one end thereof for pivotal movement with respect to the ski; a retaining element pivotally mounted at the other end of said lateral arms and including a boot holding jaw and a resilient element; guide means operatively located between said lateral arms and said retaining element for guiding the trajectory of said jaw relative to said lateral arms when said jaw is urged by the boot against said resilient element, said guide means including an element mobile with respect to one of the following two elements: the lateral arms and the retaining element; and a manual operating means for actuating said mobile element against the action of a resilient means whereby, when said guide means are located between said lateral arms and said retaining element, the trajectory of said jaw is always substantially the same, and, when said mobile element is actuated by said manual operating means, said retaining element is free to pivot with respect to said lateral arms, and the skier may release his boot from the binding.

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**3,964,760**

## SKI BRAKE

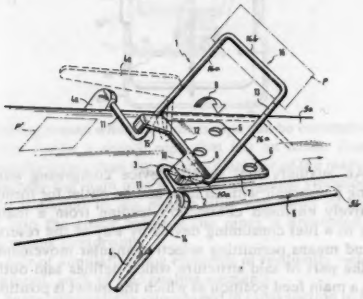
**Tilo Riedel, Eching, Germany, assignor to S.A. Etablissements Francois Salomon & Fils, Annecy, France**

**Continuation-in-part of Ser. No. 557,476, March 12, 1975. This application July 24, 1975, Ser. No. 598,628**

**Claims priority, application Germany, July 26, 1974, 2436117**

**Int. Cl.² A63C 7/10**

**U.S. Cl. 280—605** **9 Claims**



1. A brake for a ski adapted to be actuated by a skiboot, said brake comprising:
  a holder secured to said ski and defining a pair of passages parallel to the upper surface of said ski;
  a resiliently deformable wire having a central bight portion defining a plane, a pair of pivot portions respectively received in said passages and bent inwardly toward each other out of said plane from said bight portion, a pair of connecting portions bent away from said pivot portions and extending outwardly away from each other toward the sides of said ski, and a pair of leg portions extending generally parallel to each other from said connecting portions and lying out of said plane, said passages including an inner edge shaped to contact and guide said pivot portion to resiliently deform said wire and cause said leg portions to swing inwardly and upwardly upon depression of said bight portion by said skiboot, the resilient deformation of said wire causing the leg portions to swing outwardly and downwardly upon release of the bight portion by said skiboot; and
  a braking element on each of said leg portions, said holder being formed with a pair of slots which taper toward the outside edge of said ski and each constituting one of said passages.

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**3,964,761**

## SKI BOOT HEEL ATTACHMENT DEVICE

**George Eugen Syrovatka, 4998 Maisonneuve St., Montreal, Quebec, Canada**

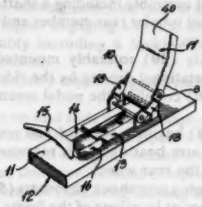
**Filed Aug. 28, 1975, Ser. No. 608,634**

**Int. Cl.² A63C 9/08**

**U.S. Cl. 280—623** **10 Claims**

1. A ski boot heel attachment device comprising a base plate attachable to a ski and adapted for sliding retention of a clamp member, said clamp member having a clamp head and an elongated slide section rearwardly thereof for displaceable sliding engagement with said base plate, a lever having a pivot connection to an end of said slide section opposite said

clamp head, and a pivotal link connection secured between said lever and said base plate to provide longitudinal sliding



displacement of said clamp member relative to said base plate by arcuate displacement of said lever about said pivot connection.

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3,964,762

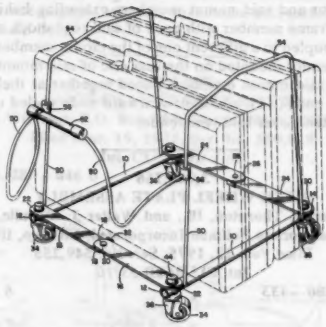
## FOLDING LUGGAGE CARRIER

John F. Adams, 55 Lee Road, Chestnut Hill, Mass. 02167

Continuation of Ser. No. 490,904, July 22, 1974. This application Oct. 16, 1975, Ser. No. 622,989

Int. Cl.² B62B 3/04

U.S. Cl. 280—439 6 Claims



1. A folding portable luggage carrier comprising:

a. a horizontal pair of spaced-apart side rails having vertical apertures adjacent to their front and rear ends;

b. a horizontal pair of front links pivoted together at their inner ends, said front links having vertical apertures adjacent to their outer ends;

c. a horizontal pair of rear links pivoted together at their inner ends, said rear links having vertical apertures adjacent to their outer ends;

d. said front link outer end apertures being vertically aligned with said side rail front end apertures, and said rear link outer end apertures being vertically aligned with said side rail rear end apertures;

e. a pair of swiveling front casters having their vertical shafts extending upwardly through said aligned front link-side rail apertures, and front retaining means engaging said caster shafts for fixing said caster shafts against downward displacement from said aligned apertures;

f. a pair of non-swiveling rear casters having their vertical shafts extending upwardly through said aligned rear link-side rail apertures, and rear retaining means engaging said caster shafts for fixing said caster shafts against downward displacement from said aligned apertures;

g. said front links and said rear links folding towards each other so that their pivoted inner ends converge and said side rails draw together in parallel relation to form a folded, portable compact unit having the same overall length as said side rails, said front links and said rear links unfolding away from each other so that their pivoted inner ends diverge and said side rails extend apart in parallel relation to form a rectangular luggage carrying platform;

h. the distance from the bottom of said casters to the extreme top of said luggage carrier being less than three times the diameter of said casters;

i. tie-down means affixed to said luggage carrier for securing luggage on the luggage carrying platform; and

j. pull cord means affixed to said luggage carrier and adapted to be gripped for pulling said luggage carrier across a surface.

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3,964,763

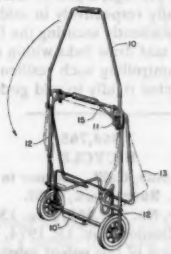
## WHEELED PUSH-CART HAVING THE UPPER PORTION OF THE HANDLE LOWERABLE FOR CONVENIENCE OF CARRYING

Jacques Dominique Stelniceanu, Room 309, 1911 Jefferson Davis Highway, Arlington, Va. 22202

Continuation-in-part of Ser. No. 209,105, Dec. 17, 1971, Pat. No. 3,774,391. This application Nov. 26, 1973, Ser. No. 418,864

Int. Cl.² B62B 1/12

U.S. Cl. 280—47.17 3 Claims



1. In a handle for a push-cart having wheels, an article support area, and a two-part handle for optionally raising the upper part, to guide, or lowering said upper part, to carry, said cart, the improvement of said handle comprising a lower handle comprising a pair of parallel side members connected at their lower ends to the said article support area, and an upper handle, comprising a second pair of parallel side members pivotally connected to said lower handle, each of said pairs of parallel side members having an integrally connected transverse member at its upper end, and securing means comprising clip members disposed upon the inner portions of the lower side members, at the upper ends thereof, for engagement of the upper side members, to maintain the latter in raised position; said engagement being releasable by the lateral compression of said upper side members to free the same from said securing means.

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3,964,764

## AIR SPRING AXLE ASSEMBLY FOR SPRING SUSPENSION AND SWAY RESTRAINING OF VEHICLE CHASSIS

Erik Georg Rickardsson, Industrigatan 14, 732 00 Arboga, Sweden

Filed Dec. 26, 1974, Ser. No. 536,442

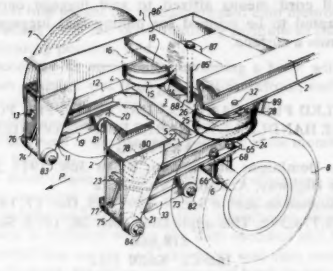
Claims priority, application Sweden, Jan. 11, 1974, 7400362

Int. Cl.² B60G 11/62

U.S. Cl. 280—702 6 Claims

1. A sway-restraining air spring axle assembly for a vehicle chassis comprising in combination: a U-shaped girder member including a pair of laterally spaced parallel legs and a web portion connected therebetween adjacent the rear end of said

legs; an air suspension spring supported on each of said legs adjacent said web; means for connecting said air suspension spring to said girder member and to said chassis; a pair of first laterally spaced shackles connected to and depending from the chassis and adapted to respectively receive therein the front end portions of said girder legs; a pair of second laterally spaced shackles connected to and depending from the respective legs of said girder member intermediate said web and front end portions of the legs; a pair of laterally spaced draw links mounted pivotally respectively in said first and second shackles; means for resiliently securing the front end portions of said girder legs to said draw links within said first shackles and for adjustably controlling such resiliency; a rigid wheel axle assembly connected rigidly to said girder member.



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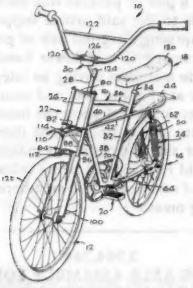
**3,964,765**

## BICYCLE

**Darwin Zenser, El Monte, Calif., assignor to Yamaha International Corporation, Buena Park, Calif.**

**Continuation of Ser. No. 387,669, Aug. 13, 1973, Pat. No. 3,865,402. This application Nov. 15, 1974, Ser. No. 523,988**
**The portion of the term of this patent subsequent to Feb. 11, 1992, has been disclaimed.**
**Int. Cl.² B62M *3/00***
**U.S. Cl. 280—276** **1 Claim**



1. A bicycle comprising:
front and rear wheels (**12, 14**) having axles;
a frame (**16**) having forward and rearward ends, the forward end having a pair of front mount locations above the level of the front wheel axle and the rearward end having a pair of rear mount locations above the level of the rear wheel axle, the frame having a multiple connector (**70**) located between the wheels and forming a pedal bearing and a swing arm bearing, and the frame including a tubular rear frame member (**32**) extending upwardly and rearwardly from the multiple connector and a tubular lower frame member (**38**) extending forwardly and upwardly from the multiple connector, said multiple connector connecting said rear and lower frame members;
a seat assembly (**18**) mounted on the frame for holding a rider, said seat assembly including a shaft (**34**) adjustably mounted in said tubular rear member and including a seat (**130**) at the top;
a pedal assembly (**20**) rotatably mounted on the pedal bearing, for rotational driving by the rider;
chain means (**80**) coupling the pedal assembly to the rear wheel;
a swing arm (**64**) having a forward end pivotally mounted on the swing arm bearing and a rearward end rotatably connected to the rear wheel;
a pair of telescoping rear shock absorbers (**50, 52**) connecting the rear mount locations of the frame to the rearward end of the swing arm;
a pair of telescoping front shock absorbers (**94, 96**) having upper portions connected to the front mount location of the frame and having lower portions rotatably coupled to the front wheel, said lower portions being of greater diameter than said upper portions and slideably receiving the lower ends of said upper portions;
the frame including a front member (**26**) coupled to the front end of the lower frame member and also including a pair of elongated shock-mount members (**40, 42**) extending rearwardly from a location near the front of the lower frame member, said mount members extending on opposite sides of the rear frame member and joined thereto and said mount members extending behind the rear frame member with each of said rear shock absorbers coupled to a different one of the mount members; and
a rear fender mounted on the rear end of said mount members, said mount members joined together at their rearward ends (**44**), and their rearward ends angled upward to extend over said rear fender.

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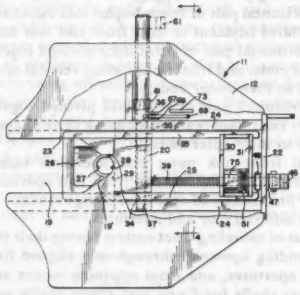
**3,964,766**

## FIFTH WHEEL PLATE ASSEMBLY

**Ray L. Ferris, Thornton, Ill., and Walter J. Marulic, Gary, Ind., assignors to Pullman Incorporated, Chicago, Ill.**

**Filed Feb. 12, 1975, Ser. No. 549,255**
**Int. Cl.² B62D *53/10***
**U.S. Cl. 280—433** **6 Claims**



1. A fifth wheel for connection to the kingpin of a highway trailer comprising:
a top plate having a substantially rectangular opening including parallel side walls and converging walls terminating in a kingpin receiving seat,
slide supports below said top plates,
a clamping member slidable on said supports, said clamping member having clamping recess forming with said kingpin receiving seat a kingpin retaining means,

slide means connected to said clamping member supported on said slide supports and movable longitudinally with respect thereto,

and means for moving said slide means and clamping means between kingpin engaging and non-engaging positions,

a lock assembly including a locking bolt having manual operating means,

guide means slidably supporting said locking bolt below said top plate,

keeper means on said slide means adapted to be engaged by said slide bolt during manual operation of said operating means to lock said clamping means in said kingpin engaging position, the improvement comprising:

signalling means for indicating locking and unlocking positions of said locking bolt including

an indicating member having an arm,

bracket means supported by and below said top plate,

pivot means connecting said arm to said bracket means on an axis substantially parallel to the axis of said locking bolt,

said locking bolt including a recess on said bolt providing a stop seat engaging a portion of said arm,

said arm portion having a camming surface thereon engaging said seat when said bolt is in said locked position and having a second surface thereon engaging said bolt when said bolt is in said unlocked position, and

the other end of said arm having a signal portion which is gravitationally urged downwardly when said camming surface engages said seat to indicate said locked position of said bolt.

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**3,964,767**

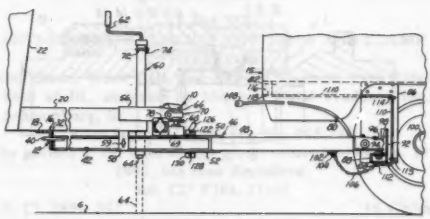
## ANTI-SWAY TRAILER HITCH

**Berdell Williams, P.O. Box 104, Tipton, Mich. 49287**

**Filed Mar. 19, 1975, Ser. No. 559,919**

**Int. Cl.² B60D** *1/00*

**U.S. Cl. 280—446 B** **9 Claims**



1. An anti-sway trailer hitch construction adapted to be connected between the forward portion of the frame of a trailer and the rearward portion of the frame of a conventional towing vehicle having a rear axle with a transverse axis or rotation and differential gearing within a differential housing, said construction comprising

an elongated tow bar having a forward portion and a rearward portion,

means on said rearward portion of said tow bar for attaching said tow bar to the forward portion of the trailer frame,

a forward coupling device support structure adapted to be secured to and depend from the rearward portion of the towing vehicle frame and extending downward therefrom into a position immediately behind and adjacent the differential housing,

and a forward coupling device having a first coupling element mounted on said support structure immediately behind and adjacent the differential housing and disposed in substantially the same horizontal plane as the axis of rotation of the rear axle,

said forward coupling device support structure and said first coupling element being movable unitarily with the rearward portion of the towing vehicle frame but movable independently of the towing vehicle differential housing and rear axle,

said forward coupling having a second coupling element mounted on said forward portion of said tow bar and separably engageable with said first coupling element in coupling relationship therewith.

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**3,964,768**

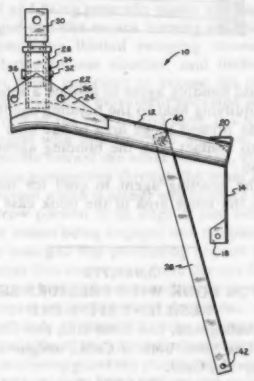
## HITCH ASSEMBLIES

**Donald F. Reynolds, 4415 E. Textile Road, Ypsilanti, Mich. 48197**

**Filed Feb. 14, 1975, Ser. No. 550,164**

**Int. Cl.² B60D** *1/00*

**U.S. Cl. 280—495** **10 Claims**



1. A hitch assembly for mounting on the frame of a motor vehicle, comprising a tubular transverse support member, end plates mounted on opposite ends of said transverse support member, each plate extending upward above and forward of the transverse support member and having means at the upper and forward ends for mounting them on the sides of a motor vehicle frame with the transverse member positioned to the rear of and below said frame, tension arms secured at their after ends to the underside of said transverse support member between the opposite ends of the transverse center thereof, said tension arms being relatively long and having means at their forward ends for securing them to opposite sides of said vehicle frame forward of the mountings of said end plates, and a hitch platform including a female hitch receptacle mounted on said transverse support member at the transverse center thereof, said hitch platform having two generally triangular platform plates mounted on the upper and lower surfaces of said transverse support member with the apex of each triangle extending rearwardly, and said female hitch receptacle being secured between said platform plates and having an open end to the rear of said platform plates for receiving a drawbar.

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**3,964,769**

## BOOK BINDING METHOD

**Leonard Shatzkin, Croton-on-Hudson, N.Y., assignor to William C. Heller, Jr., Milwaukee, Wis.**

**Filed May 23, 1973, Ser. No. 362,918**

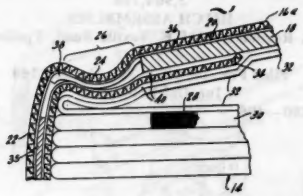
**Int. Cl.² B42C** *9/00, 11/00*

**U.S. Cl. 281—21 R** **10 Claims**

1. A method of securing a book body along the hinge area of a book case, said hinge area having a surface presenting an exposed layer of polyamide glue in the wet state, said method comprising the steps of:

applying an adhesive primer comprised of a polyvinyl acetate adhesive carried in a water base to the layer of glue before the glue has dried, said primer being compatable

with said polyamide glue and a bonding agent of the synthetic resin type;
thereafter drying the primer and the glue;
applying said bonding agent of the synthetic resin type to one of the primed hinge areas of the case and the book body said bonding agent having a thermally induced period of liquidity;



allowing said bonding agent to assume a solid state;
applying liquifying heat to the bonding agent;
bringing the primed hinge area of the case and the book body into contact with the bonding agent in the liquid state; and
allowing the bonding agent to cool for forming a bond between the hinge area of the book case and the book body.

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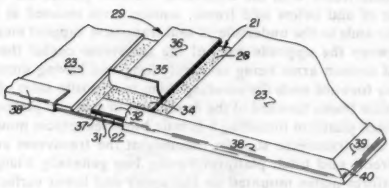
**3,964,770**

## CASE FOR BOOK WITH PRESSURE SENSITIVE RESILIENT SPINE PAD

**William H. Abildgaard, Los Altos Hill, and Charles T. Groswith, III, Los Altos, both of Calif., assignors to Velo-Bind, Inc., Sunnyvale, Calif.**

**Continuation of Ser. No. 206,001, Dec. 8, 1971, abandoned, which is a continuation-in-part of Ser. Nos. 79,086, Oct. 8, 1970, Pat. No. 3,730,560, and Ser. No. 146,648, May 25, 1971, Pat. No. 3,749,423. This application Feb. 3, 1975, Ser. No. 546,606**
**Int. Cl.² B42D *3/00***
**U.S. Cl. 281—29** **1 Claim**



**1. A case for a book for adherence to an uncased book, said case comprising a flexible outer cover, a board on each side of said case, said boards adhering to said cover and being spaced apart to provide a longitudinal central spine area between said boards and a pad attached centrally of said spine area extending longitudinally of said spine area with hinge forming areas on either side between said pad and said boards, said hinge forming areas comprising said flexible outer cover, each said hinge forming area being of substantially equal width, said pad comprising a layer of foam plastic backing material and being resiliently deformable to accommodate unevenness in the spine of the uncased book to which said pad is to be adhered said pad being attached to said spine area by a layer of adhesive on one side of said backing material, a layer of vinyl material of a length equal to that of said backing material, means securing said vinyl material to said backing material on the side of said backing material opposite the side attached to the spine area, a layer of pressure-sensitive adhesive on the outer surface of said vinyl material opposite said backing material, said layer of adhesive being thin and of substantially lesser thickness than the thickness of said foam plastic backing material, and a strip of release paper over said adhesive, the pressure-sensitive adhesive being of a type which adheres on contact without the necessity of air-drying, the width of each said hinge forming area being great enough to accommodate turning said pad over an outer spine edge of an uncased book and also to provide a thin area for the formation of a bead in the finished book, the top and bottom edges of said outer cover being turned in to conceal the top and bottom edges of said boards and of said pad, said pad being of substantially the same length as said boards and the turned-in top and bottom edges of said outer cover adhering to the top and bottom edges of said layer of vinyl material of said pad, said layer of pressure sensitive adhesive extending substantially to the inner edges of said turned-in top and bottom edges and said release paper being longer than said layer of pressure-sensitive adhesive to provide a short tab of release paper which is not in contact with adhesive, said tab comprising a pull tab for stripping said release paper from said pad.**

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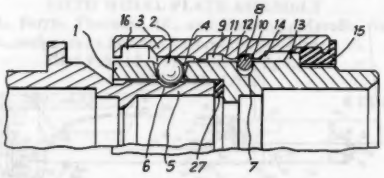
**3,964,771**

## PUSH PULL CONNECTOR

**Jean Pierre Baudouin, Evreux, France, assignor to Compagnie Deutsch, Saint Cloud, France**

**Filed Sept. 27, 1974, Ser. No. 509,832**
**Claims priority, application France, Oct. 19, 1973, 73.37329**
**Int. Cl.² F16L *37/22***
**U.S. Cl. 285—315** **10 Claims**

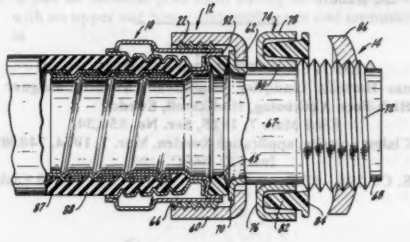


**1. A connector comprising a sleeve, a spigot for interfitting with said sleeve, a locking ball mounted on said sleeve, a recess on said spigot for engagement by the ball, a tubular member axially slidably mounted on said sleeve for travel in opposite directions between a first and a second position relative to said sleeve, the outer face of said sleeve having an annular ring of compressible material mounted thereon, a pair of spaced circumferential grooves separated by a projection formed on the inner surface of said slidable member, said projection having a peaked central area and oppositely inclined surfaces on each side thereof, means on said sleeve for locking the ball in the recess on the spigot when the sleeve is in said second position relative to said slidable member and unlocking the ball from the recess when in said first position, said peaked area of the projection engaging the compressible ring in an unstable manner so that it compresses the ring and rides thereover to place the ring in one of said pair of grooves to determine the first position of the slidable member and to place the ring in the other of said pair of grooves to determine the second position of the slidable member.**

## 3,964,772
## CONNECTOR FOR FLEXIBLE METALLIC CONDUIT AND METHOD

John A. Cox, Jr., Sycamore, Ill., assignor to Ideal Industries, Inc., Sycamore, Ill.

Continuation-in-part of Ser. No. 818,905, April 24, 1969, abandoned. This application May 17, 1971, Ser. No. 143,896
Int. Cl.² F16L 35/00
U.S. Cl. 285—39 12 Claims

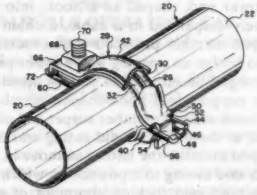


1. A body member for use in joining a connector for flexible conduit to a terminus, including a tubular sleeve with a thread form on the exterior of one end for connection to a terminus and a mounting at the other end for joining a connector, a octagon on the outside of the sleeve having a hollow annular interior opening toward the thread form, and an annular seal in the hollow of the octagon extending beyond the opening thereof so as to engage and seal against the wall of the terminus when the said one end of the sleeve is inserted through an opening in the terminus, the octagon being U-shaped in cross section with inner and outer flanges, the inner flange being circular and brazed to the outer surface of the sleeve, and the outer flange being in the form of a octagon.

## 3,964,773
## ANTI-EMISSION EXHAUST PIPE JOINT AND CLAMP THEREFOR

Bertil Stade, Wood Dale, and Edward Hoglund, Park Ridge, both of Ill., assignors to Mercury Metal Products, Inc., Schaumburg, Ill.

Filed Sept. 13, 1974, Ser. No. 505,749
The portion of the term of this patent subsequent to Jan. 29, 1991, has been disclaimed.
Int. Cl.² F16L 21/06
U.S. Cl. 285—367 16 Claims



1. A clamped joint comprising:

A. a pair of pipes, each pipe having a rolled end forming a beaded formation directly thereon at an axial end thereof, said beaded formations including respectively axially facing flange surfaces and the flange surfaces being engaged in abutment on at least respective circular contact areas substantially coaxial with the pipes to dispose said beaded formations parallel and side by side,

B. a pipe clamp formed of two generally semicircular halves each formed of a single piece of metal and having a semicircular medial portion and two ends extending respectively generally radially outwardly from the medial portions so that when the halves are mated to form a loop of the medial portions the juxtaposed ends will be generally parallel to one another at least where they connect with their respective medial portion,

C. the medial portion of each half having an arcuate cross section throughout a substantial extent of its circumferential length arranged so that there are radially inwardly facing concave groove means on the interior of each half, the concave groove means straddling and engaging the beaded formations at locations spaced from their contact area to apply wedging forces if the halves are constricted which wedging forces tend to move the beaded formations toward one another to force the flange surfaces tightly into engagement,

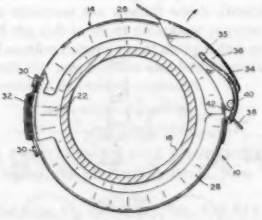
D. the first ends of each half being arranged on the same circumferential side of the loop resulting when the halves are mated and being generally planar and having cooperating tongue and slot means forming an articulated connection providing limited swinging movement of the halves relative to one another, said limited swinging movement being sufficient to expose the entire medial section, said swinging movement provided generally in a plane normal to the axis of said loop, the tongue means being integral with one first end and bent at an angle relative thereto toward the other first end, the slot means comprising a passageway through the other first end in a portion thereof which is planar and having a wide portion and a narrow portion to an edge of said other first end, the tongue means being engaged into the passageway and having an enlarged end protruding beyond the plane of the said other first end remote from the one first end, said tongue means being dimensioned to prevent withdrawal of said tongue means from said slot means, and

E. the second ends of each half being arranged on the circumferential side of said loop diametrically opposite the first ends and being generally planar and having cooperating fastening means to bring said second ends together to constrict said halves on said beaded formations.

## 3,964,774
## IRRIGATION LINE COUPLER

David W. Wollin, Eugene, Oreg., and James E. Cook, Oakland, Calif., assignors to IRECO Industries, Inc., Eugene, Oreg.

Filed Mar. 14, 1975, Ser. No. 558,270
Int. Cl.² F16L 23/00
U.S. Cl. 285—409 2 Claims



1. In an improved irrigation coupler,

a pair of coupler halves having end flanges,

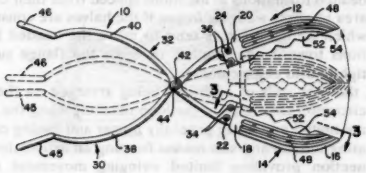
and locking band means including a pair of rigid, channel-like arcuate segments, hinge means comprising a coiled tension spring connecting one end of each segment together and latching means for releasably connecting the other ends of the segments together,

the tension spring having eye end portions and rivets securing the eye end portions to the arcuate segments in positions in which the eye portions are flat against the arcuate segments.

## 3,964,775
## TONGS

Leonard E. Boyd, 4443 Pleasant Valley Court, Oakland, Calif. 94611

Filed Jan. 3, 1975, Ser. No. 538,375
Int. Cl.² A01B 1/18; B25B 7/02
U.S. Cl. 294—16 5 Claims

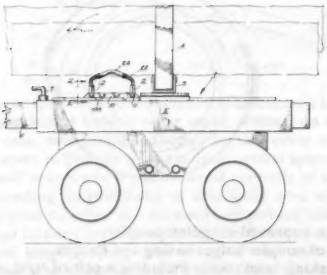


1. Tongs for the grasping of solid material comprising:
a. first jaw having a plurality of inwardly curved tines substantially parallel to each other, said tines having lateral extensions taking the form of lateral nubs oppositely oriented to and substantially touching one another to prevent the passage of solid material therebetween, said nubs partially occupying the space between said tines,
b. first handle fixedly attached to said first jaw;
c. second jaw having a plurality of inwardly curved tines substantially parallel to each other, said tines having lateral extensions taking the form of lateral nubs oppositely oriented to and substantially touching one another to prevent the passage of solid material therebetween, said nubs partially occupying the space between said tines, said second jaw cooperative with said first jaw for grasping solid materials therebetween;
d. second handle fixedly attached to said second jaw
e. pivot connecting said first handle with said second handle for relative rotation of said handles and said jaws such that separation of said handle effects separation of said jaws and vice versa.

## 3,964,776
## LIFT BAIL ASSEMBLY FOR LOG TRUCK TRAILERS

Robert C. Stott, 3609 E. 17th St., Eugene, Oreg. 97403

Filed Jan. 6, 1975, Ser. No. 538,712
Int. Cl.² B66C 1/20
U.S. Cl. 294—74 6 Claims

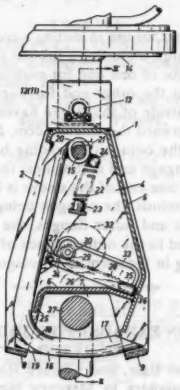


1. A lift bail assembly for attachment to a log truck trailer fore and aft of the trailer center of gravity for lifting same, and lift bail assembly comprising,
a replaceable bail including enlarged means secured to each end of the bail,
a pair of unitary fittings adapted to be detachably mounted in a spaced apart manner on the trailer fore and aft of the trailer center of gravity, each fitting including socket defining side walls and a top wall, said side walls and said top wall defining transversely directed openings in communication with the socket for bail passage permitting bail separation from the fitting, said openings of lesser width than said socket, each fitting adapted for attachment at its lower end to the trailer in a manner blocking the socket lower end thereby preventing bail separation in a downward direction from the fitting, and
said replaceable bail being disengageable without the aid of tools from each of said fittings upon fitting removal from the trailer.

## 3,964,777
## REMOTE-CONTROLLED LOADING HOOK

Jonas Herman Lindqvist, Hudiksvall, Sweden, assignor to Hiab-Foco Aktiebolag, Hudiksvall, Sweden

Filed Mar. 7, 1975, Ser. No. 556,341
Claims priority, application Sweden, Mar. 7, 1974, 7403025
Int. Cl.² B66C 1/34
U.S. Cl. 294—83 R 8 Claims



1. In a remote controlled loading hook, a hook-shaped member, a casing on said hook-shaped member journalled with its upper end on a pin in the upper portion of said casing, a driving element adapted to swing said hook-shaped member with its lower end, shaped as a hook, into said casing, said casing freely suspended in a cable, a chain or the like, said hook-shaped member provided with a locking abutment and adapted to bridge an opening in the lower part of said casing, a seat arranged on either side of said opening, said seats arranged to support said hook-shaped member in position of use, said hook-shaped member suspended on said pin in such a way that at the lifting of said casing and the loading of the hook-shaped member the latter can move in vertical direction relative to said casing to a position in which one of said seats catches behind said locking abutment of said hook-shaped member, said hook-shaped member being provided with a ratchet, one end of said ratchet being pivoted to said hook-shaped member so as to cooperate with a cogged wheel on the shaft of an electric motor arranged on said casing.

## 3,964,778
## GRAPPLE

Elno J. Jouppi, Isabella, Minn. 55607

Filed Dec. 12, 1974, Ser. No. 531,856
Int. Cl.² B66C 3/16
U.S. Cl. 294—88 2 Claims

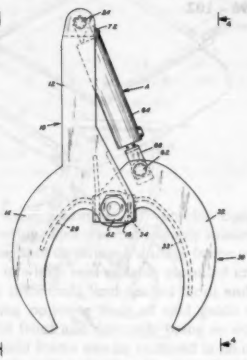
1. A grapple comprising:

a. a pair of stationary jaws each including a straight support portion having an upper and a lower end, said lower end terminating in

b. an arcuate portion depending from said lower end and offset from the longitudinal axis of said straight support portion and having

c. an extension substantially at the juncture of the support portion and the arcuate portion, said extension being short relative to the length of said straight support portion,

d. a pair of movable jaws each having an arcuate portion with an upper and lower end, said upper end terminating in



e. an extension, said extension being short relative to the length of said arcuate portion,

f. a pin pivotally mounting said extension portions of said movable jaws upon said extension portions of said stationary jaws.

g. a single hydraulic ram connected to the upper end of said straight portions of said stationary jaws and the upper ends of said arcuate portions of said movable jaws, and

h. means for actuating said ram to move said jaws relative to each other,

i. a pair of spaced ears secured to one of said stationary jaws at said pin including

j. means for connecting said ears to the end of an operative boom device.

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**3,964,779**

## EXPANSIBLE OPERATOR'S CAB

**William Merle Benson, Santa Clara, Calif., assignor to FMC Corporation, San Jose, Calif.**

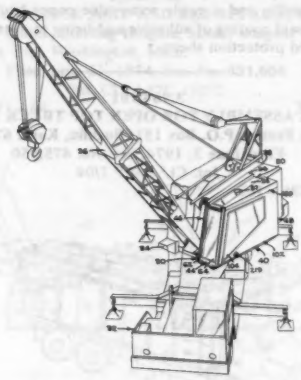
**Filed Sept. 23, 1974, Ser. No. 508,474**

**Int. Cl.² B62D *25/02***

**U.S. Cl. 296—27** **4 Claims**

**1.** An operator's cab for machinery that is mounted upon a highway vehicle, said cab having a stationary unit and an expansion wall section coupled with the stationary unit for movement sideways of the vehicle to increase the interior cab space by moving outwardly for an operator controlling the machinery and to decrease the overall width of the vehicle by moving inwardly to within maximum limits for clearance purposes during highway travel; said expansion wall section being hinged at its end located forwardly of the vehicle to the stationary unit so as to pivot about a generally vertical axis; said expansion wall section including a side frame and flanges projecting from the top, rear end, and bottom edges of the side frame towards the stationary unit; said stationary unit being shaped to receive the flanges projecting inwardly from the side frame and to maintain a dust proof sealing engagement therewith regardless of the inward or outward positioning of the expansion wall section; said flange projecting from the top of the expansion wall section being in overlapping relationship with the roof of the stationary unit and said expansion wall section further including a roller mounted at the rear end portion of the top flange to roll upon the roof of the stationary unit and thereby support the expansion wall section rearwardly of the forward hinge.

**2.** In construction machinery of the type having a transport vehicle, material handling equipment mounted upon the transport vehicle, and an operator's cab mounted beside the material handling equipment to provide an overall width dimension of the equipment and the cab that is limited by clearance requirements for highway travel; said operator's cab having an inward side wall section that is located adjacent the material handling equipment and front, top, bottom and back panels extending laterally outward from the inward side wall section



wherein the improvement comprises an expansion wall section having a vertical side frame being hingedly connected to the cab front panel adjacent the outermost edge thereof, flanges stiffening the frame and projecting laterally inward from the frame to envelope the outermost edges of the top, bottom and back panels of the cab, and an operator s control console for the material handling equipment being mounted on the inward side of the frame; said expansion wall section being movable outward to increase the interior cab space for an operator controlling the material handling equipment and being movable inward to decrease the overall width dimension of the equipment and the cab to meet clearance requirements; said expansion wall section flanges maintaining a dust proof sealing engagement with the top, bottom and back panels of the cab in either the outward or inward positions.

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**3,964,780**

## SNOW PROTECTORS FOR WINDSHIELDS

**Panjeti Babu Naidu, 89-15 Parsons Blvd., New York, N.Y. 11432**

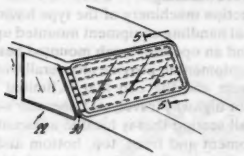
**Filed May 17, 1974, Ser. No. 470,816**

**Int. Cl.² B60J *1/20***

**U.S. Cl. 296—95 C** **2 Claims**

**1.** A wind-shield snow protector comprising a flexible plastic protection sheet, a plurality of flexible cord reinforcing elements bonded to and substantially along the entire length of the rearward side of said protection sheet, said plurality of cord reinforcing elements extending outwardly beyond the periphery of said protection sheet in at least one direction, at least one handle located beyond the periphery of said protection sheet, the free ends of said plurality of extending cord elements being secured to said handle, an adhesive coating on the rearward side of said protection sheet and at least along the outer edges thereof for detachably securing said protec-

tion sheet to a windshield, said adhesive preventing frost from creeping underneath the protective sheet said cord reinforcing elements being located inwardly of the periphery of said protection sheet except where said reinforcing elements extend



outwardly beyond the periphery of said sheet and are affixed to said handle, and a easily removable paper backing sheet engaging said coating of adhesive and being in overlying relation to said protection sheet.

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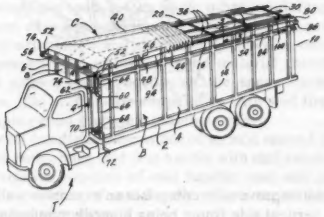
**3,964,781**

## COVER ASSEMBLY FOR OPEN TOP TRUCK BODIES

**Russell R. Fenton, P.O. Box 151, Bucklin, Kans. 67834**

**Filed June 3, 1974, Ser. No. 475,950**
**Int. Cl.² B60P 7/04**
**U.S. Cl. 296—100** **1 Claim**



1. In combination with an open top truck body having upstanding spaced apart sidewalls, a cover assembly for covering the open top of the truck body; said cover assembly comprising: a plurality of rigid cross members extending across the truck body generally from one sidewall to the other sidewall at the top of the truck body, the cross members being fixed in position with respect to the truck body; a plurality of rigid and substantially inflexible stringers secured to the cross members and extending longitudinally of the truck body, the stringers extending over the cross members so that each stringer at the location where it crosses one of the underlying cross members is located above that underlying cross member; sheaves adjacent to the sidewalls at the front and rear ends of the stringers; an endless cable looped around the sheaves and extended along each sidewall opposite the outwardly presented faces of the sidewalls so as to have a driving pass and a return pass; a flexible cover extending over and supported on the stringers, the cover having ends and sides, one of the ends of the cover being fixed in position with respect to the truck body, the other end being attached to the driving passes of the endless cables, the cover having tabs along its sides with the tabs being connected to the endless cables such that the cables can slide along and can move relative to the sides of the cover but cannot be withdrawn from the cables, whereby the cables prevent the sides of the cover from moving inwardly away from the sidewalls of the truck body, the tabs near the ends of the cover being longer than the tabs near the center of the cover, whereby the cable will assume an upwardly bowed configuration when the cover is unfolded and will maintain the center of the cover taut; and means for rotating the sheaves to drive the cables in unison and in both directions so as to cause the cover to slide over the stringers, whereby the cover folds in one direction of movement and unfolds and spreads out over the top of the truck body in the other direction of movement.

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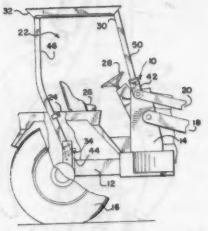
**3,964,782**

## INTERLOCKING WELDED CONSTRUCTION FOR ROLL OVER PROTECTIVE STRUCTURES

**Henry A. Pernicka, Glen Ellyn, and R. Dale Moore, Aurora, both of Ill., assignors to International Harvester Company, Chicago, Ill.**

**Filed Feb. 5, 1975, Ser. No. 547,297**
**Int. Cl.² B62D 25/06**
**U.S. Cl. 296—102** **11 Claims**



1. In a tractor having a mobile frame with steerable wheels and traction wheels including a main frame, a main frame termination plate, an operator's work area, an upwardly extending frame stanchion positioned forward of the operator's work area, providing rear attachment location for front loader boom pivotal attachment means and housing means for the tractor firewall and dashboard; the improvement comprising:

a first pair of mounting means fixedly attached to the main frame termination plate of the tractor;

a rear pair of upwardly extending posts secured at one end to said first pair of mounting means, said posts being of hollow square metal tubing;

a second pair of mounting means fixedly attached to the left and right side of the upwardly extending frame stanchion;

a front pair of upright posts secured at one end to said second pair of mounting means, said front pair of upright posts being of hollow square metal tubing;

a pair of transverse members extending fore-and-aft from each rear upright post and each front upright post;

said pair of transverse members being of hollow square tubing with each end of each said member being cut on a bias angle;

said transverse members being formed of square tubing having the inside dimension of said tubing equivalent to the exterior dimension of the square tubing of said rear and front pairs of upright posts;

each of said transverse members positioned over the uppermost end of one of each pair of said front and rear upright posts thereby linking one of each said front posts to one of each said rear upright posts through the insertion of said posts into said biasly cut end of said transverse members;

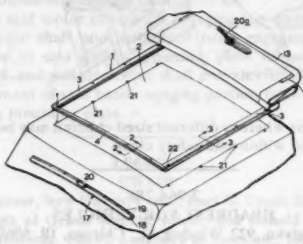
weld means securing said upright posts to said transverse members;

a pair of cross members of square tubing each fixedly attached at one end to the right said transverse member and at the other end to the left said transverse member.

## 3,964,783
## OPENING ROOF ASSEMBLIES FOR VEHICLES

John Albert Fisher, Sutton Coldfield, England, assignor to Weathershields Limited, Birmingham, England

Filed Dec. 16, 1974, Ser. No. 533,304
Claims priority, application United Kingdom, Dec. 22, 1973, 59685/73; Jan. 25, 1974, 3462/74
Int. Cl.² B60J 7/10
U.S. Cl. 296—137 C 4 Claims

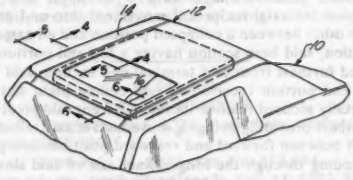


1. An opening roof assembly for vehicles comprising a flexible fabric covering, a number of slidably mounted cross-members supporting said covering, a unitary frame comprising spaced guide rails in which said slidably mounted cross-members are guided at their ends, and spaced front and rear end rails interconnecting opposite ends of said guide rails, said guide rails and said front and end rails being so constructed and arranged that said frame can be received in an opening in a roof with said guide rails extending along each side thereof, said fabric covering being movable manually between a closed position in which said opening is covered and an open position in which substantially the complete opening is exposed, wherein said guide rails comprise upper and lower spaced flanges which are directed outwardly from a vertical web with said upper flanges extending outwardly by greater distances than said lower flanges, the distances between free edges of said lower flanges being slightly greater than the spacing between corresponding side edges of said opening whereby, by tilting and slewing said frame with respect to the opening, said frame can be received therein with said upper flanges overlying roof portions on opposite sides of said opening.

## 3,964,784
## SLIDING ROOF CONSTRUCTION

Heinz C. Prechter, Grosse Ile, and Milton C. Kaltz, Allen Park, both of Mich., assignors to American Sun Roof Corporation, Southgate, Mich.

Filed July 11, 1974, Ser. No. 487,593
Int. Cl.³ B60J 7/00
U.S. Cl. 296—137 E 10 Claims

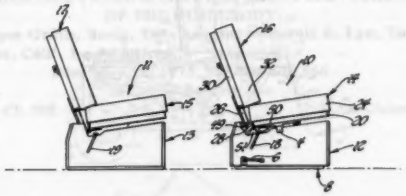


1. In a vehicle having a roof with an opening therein, a sliding roof construction for selectively opening and closing the roof opening comprising: a glass roof assembly, a frame assembly, first support means for slidably supporting said glass roof assembly in said frame assembly for sliding said glass roof assembly to first positions opening or closing the roof opening, drive means operatively connected with said first support means and said frame assembly for selectively sliding said glass roof assembly to said first positions, said glass roof assembly comprising a glass panel, a molding located about said glass panel and having a groove for grippingly receiving said glass panel, a reinforcing frame receiving said glass panel and said molding, and fastening means securing said molding to said reinforcing frame whereby said glass panel is secured to said reinforcing frame, said molding having a leg depending from said groove, said reinforcing frame having a raised portion generally matching the shape of said molding, said depending leg extending about the side of said raised portion, said fastening means securing said depending leg to said side of said raised portion.

## 3,964,785
## REVERSIBLE SEAT AND BED APPARATUS

Robert W. Plume, Sterling Heights, Mich., assignor to Travel Products, Inc., Washington, Mich.

Filed June 21, 1974, Ser. No. 481,604
Int. Cl.² A47C 1/032
U.S. Cl. 297—64 30 Claims



1. A reversible seat adapted to face one direction in a normal seat orientation and adapted to face the other direction in a reverse seat orientation, said seat comprising a base, first and second seat members, one of said members being a seat bottom while the other is a seat back in the normal orientation and vice versa in the reverse orientation, the first and second members including first and second support frames, respectively, connecting means including a linkage extending between said frames to provide a connection therebetween at a desired angularity so as to form a rigid structure with the back edge of the seat bottom frame being adjacent the bottom edge of the back frame, said connecting means being mounted on said base by a pivotal connection adjacent said back edge and said bottom edge, first and second cushion holders shiftably mounted on said first and second support frames, respectively, for motion toward and away from said pivotal connection, first and second means connected with the first and second cushion holders, respectively, for shifting them toward and away from, respectively, said pivotal connection when said members are moved from said normal orientation to said reverse orientation and vice versa.

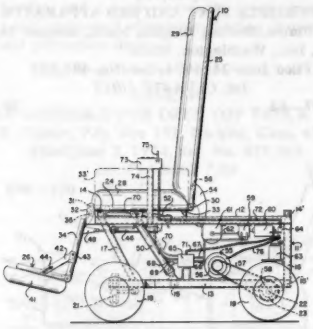
## 3,964,786
## MECHANIZED WHEELCHAIR

David Mashuda, R.D. No. 1, Evans City, Pa. 16033

Filed Dec. 20, 1974, Ser. No. 535,035
Int. Cl.² A61G 5/04
U.S. Cl. 297—330 2 Claims

1. In a wheelchair of the type comprising a body frame supported on front and rear pairs of wheels, the improvement which comprises a pair of vertically extending brackets secured on each side of the body frame at the forward end thereof, a rectangular seat frame substantially shorter in length than said body frame the forward end of which is pivotally mounted on said pair of brackets and the rear end of which rests on the top of the body frame, said seat frame being

swingable upwardly from said horizontal position through an arc to a position substantially at a right angle to the top of the body frame and vice versa, a back member having a substantially rectangular frame, means pivotally mounting one end of said back member frame to the free end of said seat frame, said back member being swingable with respect to said seat frame from a horizontal positon in which it is supported in coplanar relation to said seat frame by the top of said body frame through an arc to a position substantially at a right angle to said seat frame and vice versa, a pair of leg rest frame members, means pivotally mounting the upper ends of said leg rest frame members on said brackets for rotation on a common axis paralleling the axis of rotation of said seat frame, said leg rest frame members being swingable from a downwardly extending position at at substantial angle to the seat frame to



a position in substantial coplanar relation thereto, one fluid pressure motor means having one end pivotally mounted on the body frame and connected at the other end to said seat frame for raising and lowering said seat frame and said back frame with respect to said body frame, a second fluid pressure motor means having one end pivotally mounted on the underside of said seat frame and having the other end connected to said back member for pivotally moving said back member between said coplanar position and said angular position with respect to the said seat frame and a third fluid pressure motor means having one end thereof pivotally mounted on the body frame and connected at the other end to said leg rest frame members for swinging said leg rest frame members from said downwardly extending positions thereof into the position in substantial coplanar relation to said seat frame and vice versa.

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**3,964,787**

## CHILD'S SAFETY CHAIR

**Jean Francois Labadie; Armand R. Bernard; Olivier P. de la Taille, all of Etampes, and Christian Thary, Lure, all of France, assignors to Etablissements Bertrand Faure, Le Chesnay, France**

**Filed Mar. 11. 1975, Ser. No. 557,343**

**Claims priority, application France, Mar. 15, 1974, 74.08866**

**Int. Cl.² B60R *21/10*; A62B *35/00***

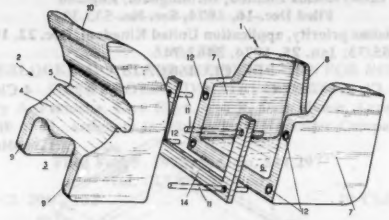
**U.S. Cl. 297—390** **3 Claims**

1. A child's safety chair for vehicles, comprising:

a seat member;

a retaining member disposed in front of said seat member and having within the lower portion thereof means defining an opening through which a child's legs may pass, said retaining member being separable from said seat member and having a height and width substantially the same as that of said seat member so as to restrain substantially the entire torso of a child under deceleration conditions of the vehicle; and

means interposed between said seat member and said retaining member for facilitating movement of said retaining member away from said seat member and for variably adjusting the distance between said seat and retaining



members whereby different sized children may be accommodated within said safety chair.

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**3,964,788**

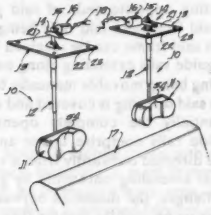
## HEADREST FOR VEHICLES

**Joseph Kmetyko, 922 Windsor St., Chicago, Ill. 60604**

**Filed July 3, 1974, Ser. No. 485,743**

**Int. Cl.² A47C *1/10***

**U.S. Cl. 297—395** **8 Claims**



1. A headrest device intended for mounting to the ceiling of a vehicle in association with the position of a vehicle seat and above the same for preventing injury to an occupant of the vehicle occupying such seat upon impact of an external object with the vehicle, the headrest device comprising:

a ceiling mounting bracket adapted to be mounted to the ceiling of the vehicle above the vehicle seat and with respect to the head of an occupant of the vehicle, a slot extending through said ceiling mounting plate, and pivot boss means mounted on said mounting plate in association with said slot;

a telescopic shaft having a base end section and a terminal end section telescopically interconnected, such sections disposed concentrically about a common axis and adapted for axial reciprocal movement into and out of each other between a collapsed position and an extended position, said base section having a top end portion disposed furthest from said terminal end section, said base top end portion received in said ceiling plate slot and pivotally secured relative thereto adjacent said pivot boss members providing swinging movement of said telescopic shaft between forward and rearward positions in a plane extending through the longitudinal axis of said slot and taken normal to the plane of said slot itself;

a segment gear affixed centrally thereof to said top end of said base section and projecting outwardly therefrom, said segment gear having an arcuate convex outer surface with gear teeth disposed longitudinally therealong;

a head engaging portion affixed to the terminal end section of said telescopic shaft and adapted for engagement with

the head of an occupant of the seat in a manner to cradle the head for the comfort of the occupant as well as to cradle the head should the vehicle be struck by an external object with the occupant's head being thrust backward during the impact; and

a reversable direct current electric motor having a gear mounted on the shaft thereof, said gear in engagement with said teethed portion of said segment gear to effect the reciprocal movement of said segment gear relative to said motor upon energization of said motor from a suitable source of electrical energy;

whereby said motor effects the swinging movement of said telescopic shaft and associated head engaging portion relative to said ceiling mounting plate for adjustment thereof, and said telescopic shaft provides for the vertical adjustment of said head engaging portion relative to said ceiling mounting plate.

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**3,964,789**

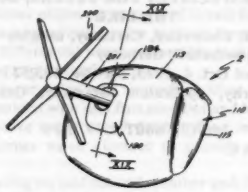
**CHAIR**

**Warren Platner, New Haven, Conn.; Earl G. Ursul; Stephen B. Kolk, both of Grand Rapids, Mich., and Ronald L. Whitwam, Caledonia, Mich., assignors to Steelcase, Inc., Grand Rapids, Mich.**

**Division of Ser. No. 344,851, March 26, 1973, Pat. No. 3,841,704. This application July 12, 1974, Ser. No. 488,054**

**Int. Cl.² A47C 7/00**

**U.S. Cl. 297—445** **4 Claims**



1. In a chair having a body mounted on a supporting base, said base including a supporting post, the improvement comprising: a plastic cover molded to a desired design configuration and secured to the bottom of said chair body and having dimensions sufficiently large for covering the upper portions of said supporting base but smaller than the dimensions of said bottom of said chair body, said cover having sufficient thickness to hold its said configuration independently of its securance to said chair body; said cover having an aperture therein through which said supporting post of said supporting base can pass; said cover including a slot extending from an edge of said aperture to the periphery of said cover, said slot being narrower in width than said supporting post and said cover being sufficiently flexible that it can be spread apart at said slot a sufficient distance to allow said cover to be slipped around said supporting post of said base during assembly of said chair; attachment means for securing said cover to said chair body.

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**3,964,790**

**BALL FURNITURE**

**Gaetan G. Bergeron, Box 1324, Assiniboia, Saskatchewan, Canada (S0H 0B0)**

**Filed Feb. 24, 1975, Ser. No. 552,054**

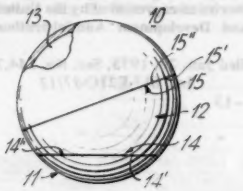
**Claims priority, application Canada, Feb. 11, 1975, 219796**

**Int. Cl.² A47C 1/12**

**U.S. Cl. 297—445** **5 Claims**

1. A piece of furniture formed from a closed hollow shell of bulbous form having a curvilinear outer surface comprising

a. a base consisting of a minor segment of the hollow shell having a lower planar edge for resting flatwise on a supporting surface, and an upper continuous peripheral edge spaced from said supporting surface; and



b. a main body consisting of a major segment of said hollow shell having the curvilinear outer surface thereof seated freely on and in substantially continuous contact with the upper peripheral edge of said base.

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**3,964,791**

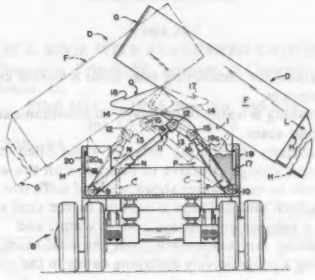
**LATERALLY TILTABLE TRUCK OR TRAILER DUMP BODY WITH HINGED SIDE PANELS AND HYDRAULICALLY OPERATED MEANS FOR OPENING EITHER SIDE PANEL AND AT DIFFERENT ELEVATIONS OF THE DUMP BODY**

**Juniper Griffis, Bowie, Tex., assignor to Harold E. Lyst, Tulare, Calif., a part interest**

**Filed May 12, 1975, Ser. No. 576,966**

**Int. Cl.² B60P 1/28**

**U.S. Cl. 298—11** **4 Claims**



1. A vehicle having a frame:

a. a dump body mounted on said frame and having at least one transversely extending plate depending below the bottom of said body;

b. said frame having a housing for receiving said transversely extending plate when said dump body rests on said frame, said housing having side walls with inwardly extending flanges at their upper ends;

c. the ends of said transversely extending plate having hook-shaped portions that slidably contact with the inner surfaces of the housing side walls;

d. hydraulic means for tilting said dump body laterally either to the right or to the left so as to incline the dump body from a horizontal position, said means including hydraulic cylinders with telescopic piston rods; and

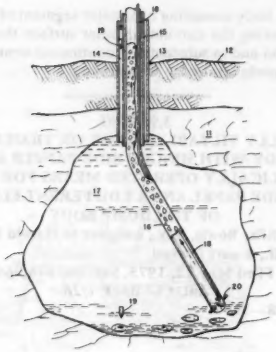
e. hydraulic valve controlled means for delivering added fluid to said cylinders for raising said dump body to a higher elevation, the operator controlling said valves for causing the desired hook-shaped portion of said plate to engage with its associate inwardly extending flange for stopping the raising of this end of said transverse plate;

f. whereby the hydraulic means will act on said dump body to cause it to swing about the engaged hook-shaped portion and to tilt said body laterally into dumping position.

## 3,964,792
## EXPLOSIVE FLUID TRANSMITTED SHOCK METHOD FOR MINING DEEPLY BURIED COAL

**Paul B. Archibald, Pleasanton, Calif., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed Jan. 28, 1975, Ser. No. 544,715**
**Int. Cl.² E21C 37/12**
**U.S. Cl. 299—13** **9 Claims**



**1.** A method for recovering coal from a buried coal seam which comprises:

a. establishing a water-filled cavity in communication with said coal seam;

b. periodically detonating in said water-filled cavity an explosive charge effective to interact with the water and generate an underwater shock wave of sufficient pressure to fracture and dislodge a portion of the coal seam and form a suspension of loose coal in water, and

c. extracting said suspension from the coal seam, thereby forming a progressively enlarging cavity in the coal seam.

## 3,964,793
## CONTINUOUS FLOW PNEUMATIC CONVEYOR SYSTEM EMPLOYING A FLUIDIZED BED COLUMN FOR THE PURPOSES OF CONTROL AND REGULATION

**Jacky Volpeliere, Mimet, France, assignor to Aluminium Pechiney, Lyon, France**

**Filed July 1, 1974, Ser. No. 484,669**
**Claims priority, application France, July 2, 1973, 73.24134**
**Int. Cl.² B65G 53/66, 53/18**
**U.S. Cl. 302—3** **4 Claims**

**1.** A system for the pneumatic conveyance of powdered materials comprising:

a. a fluidizing feed column;

b. valve means for metering powdered material into said feed column;

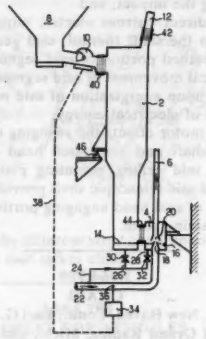
c. means for fluidizing said materials;

d. a pneumatic conveyor duct having an inlet;

e. a transfer chamber through which the fluidized materials pass from the feed column to the pneumatic conveyor duct inlet;

f. a gas injector connected to a source of pressurized gas for conveying the fluidized materials in the transfer chamber into the conveyor duct inlet; and

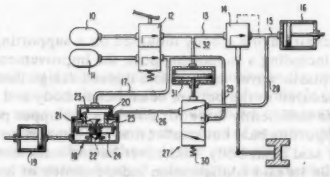
g. means for detecting the pressure of the gas injected by said injector and for controlling said valve means to regulate the rate of entry of powdered material into said feed column in proportion to the detected gas pressure.



## 3,964,794
## LOAD-DEPENDENT TWO-CIRCUIT BRAKE FOR VEHICLES, ESPECIALLY FOR TRUCKS, BUSSES OR THE LIKE

**Helmuth Scholz, Bischweier, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany**

**Filed Oct. 4, 1973, Ser. No. 403,532**
**Claims priority, application Germany, Oct. 5, 1972, 2248923**
**Int. Cl.² B60T 8/18, 8/26**
**U.S. Cl. 303—6 C** **13 Claims**

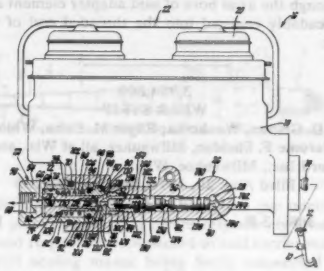


**8.** A load-dependent two-circuit brake for vehicles, which comprises means for providing a first brake circuit associated with rear wheel brakes, means for providing a second brake circuit associated with front wheel brakes, and a regulating valve means arranged in the first brake circuit means which is controlled in dependence of the load for producing a controlled pressure which varies in accordance with the load, characterized in that a control valve means for controlling the second brake circuit means is operatively connected with the second brake circuit means, said control valve means having a predetermined transmission ratio, and connecting means for actuating said control valve means by the controlled pressure in the first brake circuit means for changing the transmission ratio of the control valve means in the same sense as the variation of the controlled pressure in the first brake circuit means, the control valve means being constructed as a no-load valve means having a differential piston controlling an inlet valve and an outlet valve, said differential piston having a small piston area on which acts a feed pressure, a large piston area on which acts the brake pressure in the second brake circuit means and a differential area on which acts the control pressure.

## 3,964,795
## MODULAR PROPORTIONER

Thomas P. Mathues, Miamisburg, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 25, 1975, Ser. No. 607,200
Int. Cl.² B60T 8/26
U.S. Cl. 303—6 C 2 Claims



1. A brake pressure proportioner valve assembly adapted for removal and replacement in a housing as a preassembled unit, said assembly comprising:

a proportioner support first member having a pressure outlet and means for attaching and removing said assembly relative to a housing,

a proportioner piston preassembled in said first member and having a proportioner valve element formed thereon and having differential areas responsive to brake fluid pressures for proportioning action,

a proportioner valve seat second member secured to and preassembled with said first member and having a proportioner valve seat formed thereon for coaction with said proportioner valve element to provide a proportioner valve,

a spring acting on said second member and the proportioner piston and in said first member to continually urge said members in opposite directions toward opening of said proportioner valve;

and a brake pressure inlet passage formed in said second member and adapted to receive brake pressure to be proportioned, said inlet passage being in continuous fluid communication with one side of said proportioner valve and with the smaller of said proportioner piston differential areas, said first member pressure outlet being in continuous fluid communication with the other side of said proportioner valve and the larger of said proportioner piston differential areas, whereby brake pressure above a predetermined value in said inlet passage is proportioned to a lesser value at said pressure outlet.

## 3,964,796
## ADAPTIVE ANTI-LOCK BRAKE CONTROL APPARATUS

Richard J. Bremer, Flint, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 27, 1975, Ser. No. 562,509
Int. Cl.² B60T 8/02
U.S. Cl. 303—21 BE 3 Claims

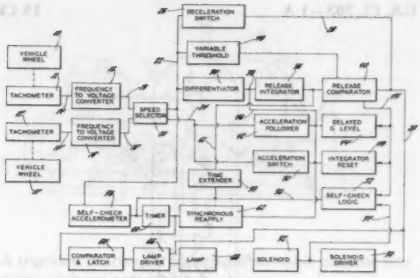
1. A control apparatus for an anti-lock brake system for a vehicle with braked wheels comprising

means providing a speed signal which represents wheel speed,

a control circuit for producing an on/off control signal,

release means activated by the control signal to effect brake release when the control signal is initiated and brake reapplication when the control signal is terminated,

the control circuit including means responsive to the speed signal for deriving a velocity error signal representing the difference between wheel speed and an estimated vehicle speed and means for producing the control signal when the velocity error signal exceeds a first threshold indicative of incipient wheel lock and terminating the control signal when the velocity error signal drops below a second threshold lower than the first threshold,



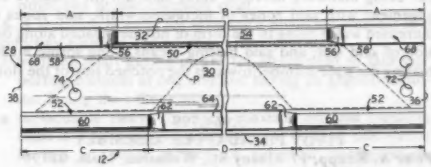

reapply means effective during brake release for terminating the control signal when the wheel experiences low acceleration for at least a minimum time period,

and means responsive to the instantaneous value of the velocity error signal for retarding the action of the reapply means and extending the time period when the velocity error signal is large.

## 3,964,797
## TRACK SHOE WITH STAGGERED GROUSERS

Fred T. Swanson, Trivoli, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 3, 1975, Ser. No. 555,334
Int. Cl.² B62D 55/28
U.S. Cl. 305—54 4 Claims




1. A track shoe with staggered grousers comprising;

an elongated rectangular planar body portion having a predetermined leading edge, a trailing edge, a pair of side edges, and a flat outer wear surface therewithin;

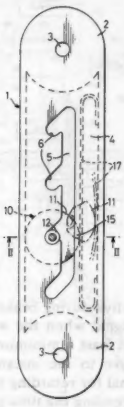
a leading grouser having a width of approximately 70% of the overall width of the shoe which extends integrally outwardly from said wear surface in parallel juxtaposed relation to said leading edge centrally thereof; and

a pair of laterally spaced trailing grousers having a collective width of approximately 40% of the overall width of the shoe which extends integrally outwardly from said wear surface in parallel juxtaposed relation to said trailing edge and laterally inwardly from said side edges to provide an overlap relationship of approximately 5% of the overall width with respect to said leading grouser and to cause adhering mud or the like to be released from entrapment between said leading grouser, said trailing grousers, and said outer wear surface for improved penetration and traction.

## 3,964,798
## SAFETY BELT ANCHORAGES

David William Burleigh, Yateley, England, assignor to Britax (London) Limited, Byfleet, England

Filed Feb. 7, 1975, Ser. No. 548,031
Claims priority, application United Kingdom, Feb. 14, 1974, 6695/74
Int. Cl.² F16C 29/02
U.S. Cl. 303—1 A 15 Claims

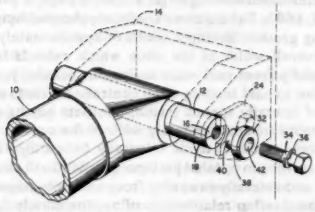


1. An anchorage member for a safety belt, said anchorage member comprising an elongated load bearing support having a series of abutment means along its length, a slide member mounted on said support for anchoring a safety belt, said slide member being manually movable for selective engagement with said abutment means, and biasing means serving to maintain the slide member in engagement with the selected abutment means, said elongated load bearing support being formed with a slot with zones of increased width at at least two spaced locations along its length, said slide member having a width greater than the width of said slot, and said slide member being manually movable along said slot for selective engagement with said zones of increased width, said zones of increased width being in the form of notches spaced along one side of said slot; and said biasing means being spring means biasing the slide member towards the notched side of the slot.

## 3,964,799
## PIVOT PIN ADAPTER ASSEMBLY

Peter A. Knapp, 17 Albany St., Wollaston, Mass. 02170

Filed June 9, 1975, Ser. No. 585,180
Int. Cl.² F16C 7/00
U.S. Cl. 308—2 R 10 Claims



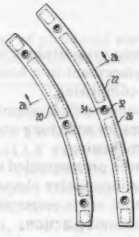
1. For use with a cylindrical pivot pin having an axially bored, internally threaded end, an adapter assembly comprising:

a. a stepped cylindrical adapter element having a head portion and a contiguous, axially aligned, reduced diameter neck portion, said adapter element having an axial bore throughout its entire length; and
b. a bolt having an externally threaded shank sized to fit the pivot pin threaded end, said shank having a length greater than the axial length of said adapter element;
c. said bolt being inserted into the head portion end and through the axial bore of said adapter element and being threadably engaged into the threaded end of the pivot pin.

## 3,964,800
## WEAR STRIP

Donald D. Grimes, Waukesha; Roger M. Hahn, Whitefish Bay, and Jerome F. Sheldon, Milwaukee, all of Wis., assignors to Rexnord Inc., Milwaukee, Wis.

Filed Aug. 20, 1975, Ser. No. 606,253
Int. Cl.² F16C 5/00
U.S. Cl. 308—3 R 11 Claims



1. A wear strip for conveyor chains, said wear strip comprising:

a. a flat upper wear member, the upper surface of which is adapted to contact and guide conveyor chains, said flat upper wear member having at least two holes therethrough for the reception of connection means, said holes being spaced apart along the length of said flat upper wear member;
b. at least one linear support member joined to said flat upper wear member along the underside thereof and adapted to contact the surface of a structure over which conveyor chains are to be run in order to provide support for said flat upper wear member; and
c. at least two base members joined to said flat upper wear member on the underside thereof at the location of said at least two holes in said flat upper wear member, each of said base members having at least one hole therethrough for the reception of connection means, said at least one hole in each of said base members being in registry with the corresponding hole in said flat upper member.

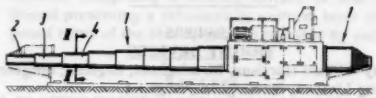
## 3,964,801
## WIPING DEVICE FOR TELESCOPICALLY DISPLACEABLE COVER BOXES OF COVERING DEVICES ON SLIDING AND GUIDING PATHS OF MACHINE TOOLS

Dietmar Steinmetz, Siegen, Germany, assignor to Kabelschlepp Gesellschaft mit beschrankter Haftung, Siegen, Germany

Filed Jan. 13, 1975, Ser. No. 540,713
Claims priority, application Germany, Jan. 15, 1974, 2401674
Int. Cl.² F16C 23/02
U.S. Cl. 308—3.5 5 Claims

1. For use in connection with a machine tool having a sliding and guiding path, a covering device for covering such path, which includes: a plurality of telescopically interengaging cover boxes movable relative to each other, each of said cover

boxes being provided with a rear wall for resting on such sliding and guiding path, wiper means respectively interposed between two cover boxes adjacent to each other and one above the other, each of said wiper means including a carrier member connected to the top portion of the respective adjacent cover box and having its lower surface resting on the respective next lower cover box for conveying the weight of the former onto the latter, each of said carrier members defining with the cover box pertaining thereto a gap open at one end, and a plurality of sealing means respectively arranged in said gaps and respectively connected to said carrier members, each of said sealing means being firmly connected to the respective pertaining carrier member, each of said carrier members being provided with teeth and each of said sealing means consisting of elastic material and having an outer wiping lip and having teeth positively engaging the teeth of the respective adjacent carrier member.



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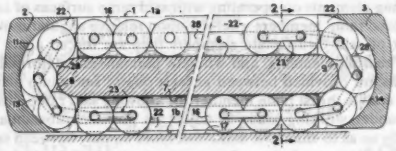
**3,964,802**

## BEARING FOR RECTILINEAR MOTION

**Alfred Pitner, Paris, France, assignor to Nadella, France, a part interest**

**Continuation-in-part of Ser. No. 317,360, Dec. 21, 1972, abandoned. This application Aug. 5, 1974, Ser. No. 494,889**
**Claims priority, application France, Aug. 7, 1973, 73.28819**
**Int. Cl.² F16C** *17/00*
**U.S. Cl. 308—6 C** **26 Claims**



**1.** In a rolling bearing for guiding two parts subjected to a relative movement of translation, comprising a row of rolling elements having planar end surfaces, a body structure defining two rectilinear and parallel inner raceways, two semi-circular inner raceways which interconnect the rectilinear inner raceways, two part-circular outer raceways defining with the semi-circular inner raceways two passages for the re-circulation of the rolling elements and planar guide surfaces for guiding the planar end surfaces of the rolling elements; the improvement comprising retaining means for retaining the rolling elements to within a predetermined distance from the rectilinear inner raceways, which retaining means comprise means defining blind axial apertures in opposite ends of the rolling elements, the rolling elements being solid in a part of the rolling elements intermediate the blind apertures, said retaining means further comprising grooves in the body structure adjacent the planar guide surfaces and retaining elements extending axially of the rolling elements into the apertures and axially beyond the planar guide surfaces and into the grooves, the grooves defining surfaces which are engageable by the retaining elements axially of the rolling elements for retaining the retaining elements in the apertures.

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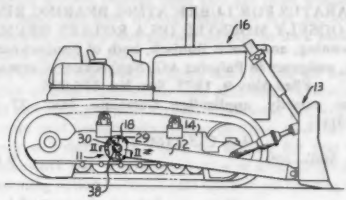
**3,964,803**

## SELF-ALIGNING TRUNNION BEARING ASSEMBLY

**Larry G. Eftefield, and Leon A. Wirt, both of Joliet, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Nov. 22, 1974, Ser. No. 526,284**
**Int. Cl.² F16C** *11/06, 23/04, 25/04, 33/08*
**U.S. Cl. 308—72** **6 Claims**



**1.** A trunnion bearing for securing a pivotable element to a supporting element comprising:

a trunnion shaft having means for attachment to said supporting element at one end and having an annular shoulder facing the other end,

a replaceable sleeve disposed coaxially on said trunnion shaft in abutment with said shoulder thereof, said sleeve having an outer surface of spherical configuration,

a pair of bearing cap members secured together by releasable means and having inner surfaces which jointly form a spherical surface conforming to said outer surface of said sleeve and which is in contact therewith, one of said bearing cap members having means for attachment to said pivotable element,

a circular retainer member abutted against said other end of said trunnion shaft in coaxial relationship therewith and being of greater diameter than said other end of said trunnion shaft to form a radially outwardly extending surface adjacent said other end of said trunnion shaft in order to hold said replaceable sleeve thereon, and

disengageable threaded fastener means extending from said other end of said trunnion shaft into said retainer member to hold said retainer member in abutment against said other end of said trunnion shaft.

**6.** A trunnion bearing for securing a pivotable element to a supporting element comprising:

a trunnion shaft having means for attachment to said supporting element at one end and having an annular shoulder facing the other end,

a replaceable sleeve disposed coaxially on said trunnion shaft in abutment with said shoulder thereof, said sleeve having an outer surface of spherical configuration, wherein said replaceable sleeve extends a distance outwardly from said other end of said trunnion shaft and has an annular recess forming an extension of the end surface of said trunnion shaft,

a pair of bearing cap members secured together by releasable means and having inner surfaces which jointly form a spherical surface conforming to said outer surface of said sleeve and which is in contact therewith, one of said bearing cap members having means for attachment to said pivotable element,

a circular retainer disposed against said other end of said trunnion shaft in coaxial relationship therewith and being of greater diameter than said other end of said trunnion shaft in order to hold said replaceable sleeve thereon, wherein said circular retainer is a flat disc disposed against said end surface of said shaft and against said extension of said end surface formed by said sleeve recess and being transpierced by a plurality of spaced-apart stepped bores, and

disengageable fastener means extending from said other end of said trunnion shaft into said retainer to hold said re-

tainer thereon, wherein said disengageable fastener means are a plurality of threaded bolts each extending into one of said bores and being engaged in said other end of said trunnion shaft, said bolts being substantially wholly contained within said other end of said trunnion shaft and said bores of said retainer.

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**3,964,804**

## APPARATUS FOR LUBRICATING BEARING RINGS LOOSELY MOUNTED ON A ROTARY DRUM

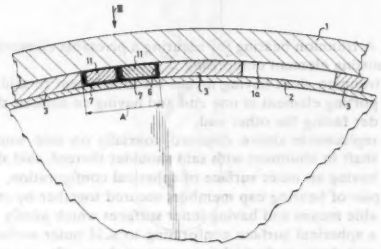
**Kurt Henning, and Horst Bonisch, both of Neubeckum, Germany, assignors to Polysius AG, Neubeckum, Germany**

**Filed May 9, 1975, Ser. No. 575,955**

**Claims priority, application Germany, Mar. 27, 1974, 7418335[U]**

**Int. Cl.² F16C 1/24**

**U.S. Cl. 308—109** **9 Claims**



1. Apparatus comprising a rotary drum casing, support plates affixed to said casing at regular intervals around its periphery, and a bearing ring which is carried by the support plate and is free to rotate relative to said casing, wherein the improvement comprises at least one box which is disengageably mounted in the space between two adjacent support plates and is open on the side facing the inner surface of the bearing ring, and a graphite plate for lubricating such inner surface which is loosely held in said box.

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**3,964,805**

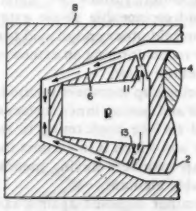
## DYNAMIC FLUID RESERVOIR BEARING

**Howard E. Schulien, Montville, N.J., assignor to The Bendix Corporation, Teterboro, N.J.**

**Filed Sept. 27, 1974, Ser. No. 509,777**

**Int. Cl.² F16C 1/24, 3/02, 32/06, 33/66**

**U.S. Cl. 308—122** **6 Claims**



1. Lubricating apparatus for a bearing of the type including a generally conical member carrying a plurality of spiral grooves and rotating in a relatively close fitting sleeve, comprising:

a lubricant reservoir internal to the bearing and rotating therewith, and orifices leading from the reservoir to the bearing, the reservoir including an air evacuation port and packed with a lubricant absorbant for permitting air evacuation through the port without lubricant leakage in a predetermined gravitational field;

the lubricant flowing through the orifices and to the bearing by the pumping action effected by the spiral grooves on the rotating bearing; and

pumping means in a predetermined pressure flow arrangement and initially operative to augment the pumping action effected by the spiral grooves for providing a bearing having improved starting conditions and for insuring continuous lubricant flooding of the bearing.

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**3,964,806**

## THRUST DEVICES

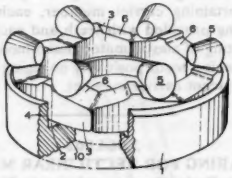
**Anthony William Harrison, Birmingham, England, assignor to Girling Limited, Birmingham, England**

**Filed Oct. 31, 1974, Ser. No. 519,774**

**Claims priority, application United Kingdom, Nov. 2, 1973, 51085/73**

**Int. Cl.² F16C 33/38**

**U.S. Cl. 308—235** **14 Claims**



1. A thrust device comprising two parallel axially aligned thrust plate members angularly movable relative to each other about their mutual axis, at least one ramp member carried by the adjacent face of each of said plate members and opposite to one another, said ramp members each having a ramp surface of which said surfaces are opposed and oppositely inclined, means preventing circumferential movement of said ramp members relative to their respective plate members, bearing elements co-operating with said ramp surfaces of said opposed ramp members whereby upon relative angular movement of said thrust plate members they are forced apart by said bearing elements, and wherein permanently deformable means are provided between at least one of said ramp members and its thrust plate member for allowing said ramp member under working loads to adjust its position substantially axially so as to share the axial load more equally between said bearing elements during subsequent actuations of the device.

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**3,964,807**

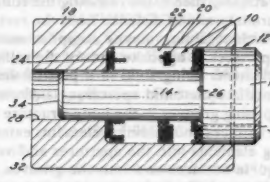
## LOW FRICTION BUSHING AND METHOD

**Charles S. White, Palmdale, Calif. 93550**

**Continuation of Ser. No. 321,566, Jan. 8, 1973, abandoned, and a continuation-in-part of Ser. No. 76,110, Sept. 28, 1970, abandoned. This application May 5, 1975, Ser. No. 574,397**

**Int. Cl.² F16C 27/00**

**U.S. Cl. 308—238** **4 Claims**



1. A low friction bushing comprising:

a hollow cylindrical element consisting essentially of a plurality of layers of continuous turns of a strand of low friction thread comprised of bondable filaments and polytetrafluoro ethylene filaments, wherein the thread is impregnated with a bondable resin;

said threads compressed together axially of the cylindrical element and held in radially expanded integrated relation by a matrix of solidified and cured bonding resin distributed throughout the layers;

and one of the cylindrical surfaces of the hollow cylindrical element comprising a bearing surface of low friction thread presenting a substantially uniform layer of juxtaposed turns of the thread bonded together by said resin.

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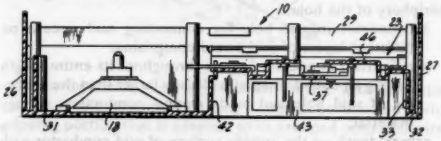
**3,964,808**

## ALL-PLASTIC HOUSING FOR A SMALL COMPACT TAPE REPRODUCER AND RECORDER

**Nobuo Suzuki, Sagamihara, Japan, assignor to Technical Incorporated, Japan**

**Filed Dec. 4, 1974, Ser. No. 529,401**
**Int. Cl.² G11B *1/00***
**U.S. Cl. 312—8** **5 Claims**




1. A housing for a tape reproducer/recorder maching comprising a molded plastic housing member having external walls, a raised internal chassis portion of said housing member being attached to at least one of said external walls by an internal wall connected to said chassis portion which connects to said one external wall by a connection member to form a double wall structure to isolate said chassis portion from said at least one external wall and at least one other internal wall connecting said raised chassis portion to said housing.

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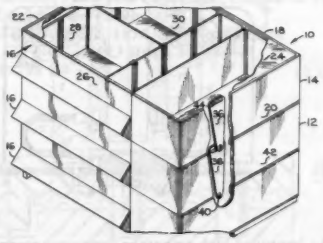
**3,964,809**

## MODULAR CABINET STRUCTURE

**Chester Wirbilowicz, Clifton, and H. Theodore Young, Union, both of N.J., assignors to Becton, Dickinson and Company, East Rutherford, N.J.**

**Filed May 21, 1975, Ser. No. 579,377**
**Int. Cl.² A47B *87/00***
**U.S. Cl. 312—111** **4 Claims**




1. A modular cabinet structure comprising:

a. a first level framework having a rear wall; a pair of sidewalls extending transversely from opposite ends of said rear wall; each of said sidewalls having a lower end and an upper end, a pin extending inwardly from at least one of said sidewalls adjacent one of said ends, a locking tab pivotally mounted to said one sidewall by said pin, and a slot extending through portions of said tab;

b. a second level framework having a rear wall; a pair of sidewalls extending transversely from opposite ends of said rear wall; each of said sidewalls having a lower end and an upper end, a pin extending inwardly from at least one of said sidewalls adjacent one of said ends; said second framework pin having an enlarged head at its inner end and said first framework slot having a first section sufficiently large to receive said pin enlarged head and a second section smaller than said pin head whereby said pin head can pass through said slot first section to be captured by said slot second section to lock said frameworks together; and,

c. one of said frameworks being stacked one on top of the other of said frameworks with said first framework lock tab slot engaging said second framework pin whereby to secure said frameworks to one another; said first framework slot defining a camming surface for said second framework pin, whereby rotation of said tab produces a camming action between said slot and pin tending to draw said frameworks toward one another.

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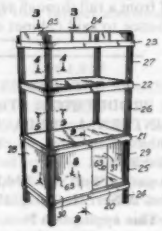
**3,964,810**

## MODULAR SHELF AND CABINET SYSTEM

**Thomas V. Murphy, P.O. Box 156, Oradell, N.J. 07649**

**Filed May 15, 1975, Ser. No. 577,901**
**Int. Cl.² A47B *13/02***
**U.S. Cl. 312—257 R** **13 Claims**




1. In a modular structural system for the assembly of display shelving and the like and of the type including separable shelf panels and spacer columns, the improvement characterized by

a. said spacer columns being formed of extruded sections and being of relatively uniform hollow cross section throughout,

b. said shelf panels being of molded plastic construction and including generally flat panel sections and integral, downwardly extending peripheral flanges along all sides,

c. said shelf panels having, at a plurality of spaced points, integral, upwardly extending lug posts,

d. said lug posts being of such dimensions and of such cross sectional configuration as to be tightly received within the hollow interior of said spacer columns,

e. said shelf panels further having integral, downwardly opening sockets at a plurality of spaced points, and

f. said sockets being of such dimensions and of such cross sectional configuration as to tightly receive an end portion of a spacer column.

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**3,964,811**

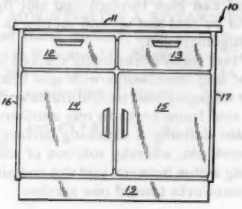
## TENSION ROD CABINET SYSTEMS

**Robert G. McClelland, Grand Rapids, Mich., assignor to E. H. Sheldon and Company, Muskegon, Mich.**

**Filed Feb. 20, 1975, Ser. No. 551,336**
**Int. Cl.² A47B *48/00***
**U.S. Cl. 312—265** **14 Claims**

1. In a cabinet system including at least two upright sidewalls of generally rectangular shape and a plurality of stretcher rail assemblies securing said sidewalls together at

upper front, upper rear, lower front and lower rear corners thereof, each assembly including a stretcher rail and a tension rod, the improvement comprising: each of said stretcher rails being a channel rail of modified C shape with stiffened flanges formed of light gauge metal and defining a continuous elongated opening along one side for permitting access to the




interior of the rail, and including an outwardly extending fastening flange extending along said opening; and a spacer plate located at each end of said rails and fixed to said rails, each spacer plate defining an aperture for snugly centrally receiving and positioning an associated tension rod, whereby load is transmitted from a rail through said spacer plates to the tension rod and thence to said cabinet side walls.

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**3,964,812**

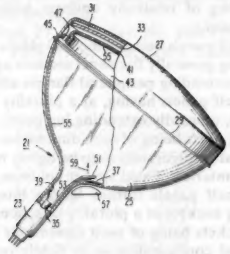
## METHOD FOR PRODUCING A STRONTIUM METAL FILM ON INTERNAL SURFACES OF A CRT

**John Coryell Turnbull, Lancaster, Pa., assignor to RCA Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 394,841, Sept. 6, 1973, abandoned, Division of Ser. No. 532,729, Dec. 13, 1974, Pat. No. 3,952,226. This application Nov. 19, 1975, Ser. No. 633,465**

**Int. Cl.² H01J 7/18**

**U.S. Cl. 316—25** **10 Claims**




**1.** A method for producing within an evacuated electron tube a strontium metal film for sorbing residual gases comprising positioning within said envelope a mass comprising an alloy consisting essentially of about 40 weight parts strontium metal and about 55 to 65 weight parts aluminum metal, sealing said envelope, heating said mass until a substantial proportion of the strontium in said mass is liberated and vaporized, and condensing said vaporized strontium as a metal film on surfaces within said envelope.

**3,964,813**

## CONNECTOR

**Donald E. Pizzeck, Hampton, Va., assignor to The United States of America as represented by the United States National Aeronautics and Space Administration, Washington, D.C.**

**Filed Feb. 10, 1975, Ser. No. 548,468**

**Int. Cl.² H05K 1/10; H01R 25/00**

**U.S. Cl. 339—17 M** **3 Claims**

**1.** A multi-layer printed circuit board having a hole through it with circuits on different layers of the board extending to the periphery of the hole;

a connector in said hole for connecting said circuits on different layers of said board comprising:

a cylindrical conductor hollow throughout its entire length having an outside diameter slightly larger than the diameter of said hole and made from a conductive, springy material;

several teeth on the outside surface of said conductor with each tooth extending the full length of said conductor; and

a single slit in said conductor extending the full length of the conductor whereby the springback of said conductor forces said teeth into contact with all of said circuits extending to the periphery of said hole.

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**3,964,814**

## PLUGGABLE HIGH-AMPERAGE CONTACT

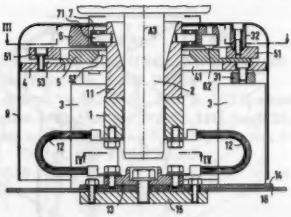
**Wolfgang Kalbitz; Erwin Keyl, both of Erlangen; Herbert Nitsche, Spardorf, and Friedrich Scherbaum, Erlangen, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany**

**Filed Apr. 5, 1974, Ser. No. 458,406**

**Claims priority, application Germany, Apr. 6, 1973, 2317419**

**Int. Cl.² H01R 13/62**

**U.S. Cl. 339—64 R** **12 Claims**




**1.** An improved high-amperage connector receptacle of the type wherein the cylindrical plug is inserted into a funnel-like connector receptacle comprising:

a. base means;

b. a connector receptacle having a funnel shaped entrance portion;

c. first means to suspend said receptacle for rotation about two mutually perpendicular axis which axes are mutually orthogonal to an axis normal to the plane of said base means;

d. second means resting on said base means and supporting said first means, said second means mounted for lateral motion in the plane of said base means and for rotation about said axis normal to said base means whereby said receptacle will be orientatable in all directions and movable laterally in the plane of said base means.

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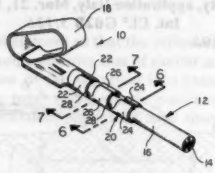
**3,964,815**

## INSULATION PIERCING TERMINAL

**Cletus McDonough, Elmhurst, Ill., assignor to Molex Incorporated, Lisle, Ill.**

**Filed Feb. 26, 1975, Ser. No. 553,083**
**Int. Cl.² H01R *11/08***
**U.S. Cl. 339—97 C** **3 Claims**



1. An insulation piercing terminal for use with insulation clad wire, said terminal including a contact portion and a wire gripping portion that is adapted to be crimped onto said wire, the improvement in said wire gripping portion comprising:

a central elongated wire supporting area having a longitudinal axis and defining a bottom support for the wire;

a pair of insulation piecing wings having sharp ends, each extending outwardly in opposite directions from the wire supporting area around half the wire, meeting at a location on top of the wire, piercing the insulation at said top location so that the ends of the wings extend downwardly into and contact the wire, and contacting the wire supporting area so that each piercing wing encloses substantially one half of the cross section of the wire; and

two pairs of insulation gripping wings one on either side of and spaced from said piercing wings, each insulation gripping wing of each pair extending outwardly in opposite directions from the wire supporting area a lesser distance than the insulation piercing wings each gripping wing being wrapped about the clad wire.

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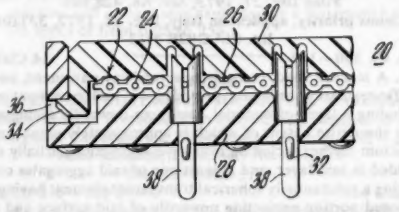
**3,964,816**

## ELECTRICAL CONTACT

**Ronald S. Narozny, Panorama City, Calif., assignor to Thomas & Betts Corporation, Elizabeth, N.J.**

**Filed Aug. 22, 1974, Ser. No. 499,588**
**Int. Cl.² H01R *13/38***
**U.S. Cl. 339—99 R** **12 Claims**



1. An electrical contact for piercing through the insulation of an insulated electrical conductor to make electrical contact with the conductor itself comprising: a longitudinally slotted, generally cylindrical body portion formed of a flat, resilient, conductive material having a top edge and a bottom edge, said longitudinal slot extending from said top edge to said bottom edge, the edges of said body portion defining said longitudinal slot being spaced apart to bite into the insulation of said conductor causing said longitudinal slot defining edges to move apart further and maintain a continuous contact therewith due to the attempt of the resilient material to recover its original configuration and provide strain relief for an insulated conductor forced into said contact; a further slot formed in said body portion directly opposite said longitudinal slot and extending from said top edge of said body portion towards said bottom edge of said body portion and terminating intermediate said top and bottom edges of said body portion, said further slot proportioned to cut through the insulation about said insulated conductor and engage the conductor to made a good electrical contact therewith when an insulated conductor is forced into said further slot, the entry of an insulated conductor into said further slot forcing the edges of said body portion defining said further slot to separate further, the resiliency of said material attempting to axially return said body portion to its original configuration to maintain continuous engagement between said edges defining said further slot and the conductor of the insulated conductor placed therein; the arcuate segments formed by said longitudinal slot and said further slot providing first and second arms terminating in sharp points at said top edge of said body portion, and having shoulder portions sloping from said point to each side of said first and second arms to guide an insulated electrical conductor into said longitudinal slot and said further slot; and a tail portion coupled to said body portion bottom edge to permit said contact to be coupled to a further electrical terminal point.

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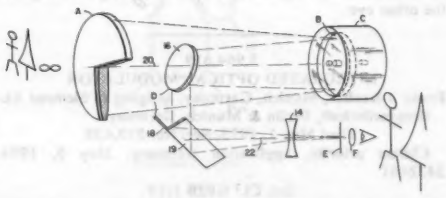
**3,964,817**

## OPTICAL STABILIZER HAVING SPACE REFERENCED MOTION

**William E. Humphrey, Oakland, Calif., assignor to Optical Research and Development Corporation, Berkeley, Calif.**

**Continuation-in-part of Ser. Nos. 75,965, Sept. 28, 1970, Pat. No. 3,711,178, and Ser. No. 215,485, Jan. 5, 1972, Pat. No. 3,761,157. This application Oct. 16, 1972, Ser. No. 298,050**
**The portion of the term of this patent subsequent to Jan. 16, 1990, has been disclaimed.**
**Int. Cl.² G02B *23/00***
**U.S. Cl. 350—16** **7 Claims**



1. An optical stabilizer for use in combination with an optical instrument for stabilizing rapid angular vibration comprising: walls defining a chamber having a transparent portion; a fluid within said chamber; means for optical ray deflecting immersed in said fluid; means for mounting said deflecting means for movement in said fluid; means for biasing said deflecting means toward a neutral deflecting position with respect to a transparent portion of said chamber-defining wall; and means for coupling including a surface moveable with said walls and a surface moveable with said deflecting means for coupling said deflecting means to said wall through said fluid to act on said biasing means through said deflecting means and also to act on inertia of said fluid deflecting means; said surface moveable with said walls acting upon and moving said fluid, and said surface moveable with said deflecting means being moveable in response to said movement of said fluid to produce space referenced angular orientation of said deflecting means at a rate proportional to but different from the

vibrational angular orientation of said walls with respect to a point in space.

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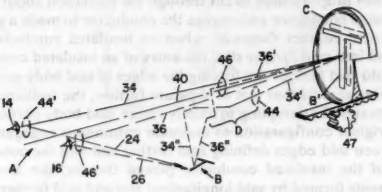
3,964,818

## REMOTE STEREO MICROSCOPE WITH FIELD MIRROR REFLECTED OCULAR PATHS

William E. Humphrey, Oakland, Calif., assignor to Humphrey Instruments, Inc., Berkeley, Calif.

Filed Mar. 28, 1975, Ser. No. 563,281
Int. Cl.² G02B 21/20, 17/00, 27/24; G03B 21/00
U.S. Cl. 350—36 15 Claims




1. A microscope for projecting magnified stereo images of an object to eyes of a viewer at binocular locations in space removed from said object, said microscope comprising: a stereo magnifier with paired magnified paths; each path having a magnifier viewing pupil, said stereo magnifiers addressed to said object at a distance to project stereo images of said object at a preselected distance away from said magnifier along an optical path; a field mirror having an axis aligned to receive the projected image from each magnified path of said stereo magnifier in substantially the plane of said mirror; said paired magnified paths from said stereo magnifier between said field mirror and said magnifier including means for relaying one magnified path from one side of said mirror axis to the other side of said mirror axis and the other magnified path from said other side of said mirror axis to said one side of said mirror axis and said field mirror disposed with respect to the eyes of said viewer to relay the light of said images to the eyes of the viewer and to relay the conjugate location of the viewing pupils of said magnifier so that the eyes of the viewer when positioned at the relayed viewing pupils view the image in the plane of the mirror for one eye without viewing the image for the other eye.

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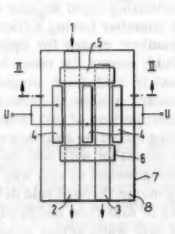
3,964,819

## INTEGRATED OPTICAL MODULATOR

Franz Auracher, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed May 1, 1975, Ser. No. 573,439
Claims priority, application Germany, May 9, 1974, 2422401
Int. Cl.² G02B 5/14
U.S. Cl. 350—96 WG 2 Claims




1. In an integrated optical modulator for modulating optical signals in dielectric wave guides, said modulator having a substrate with a surface supporting two wave guides extending in parallel spaced relationship with each other and having their upper and lower surfaces being a pair of co-planar surfaces, said modulator including three parallel extending electrodes supported on the surface of the substrate with an electrode adjacent each edge of the two wave guides, and extending parallel thereto, the improvement comprising the modulator including two short couplers, said short couplers being short coupling wave guides and being spaced from one another on said parallel wave guides and extending at right angles thereto and being separated from the said parallel wave guides by a dielectric low loss film.

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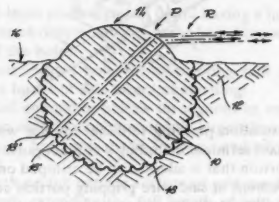
3,964,820

## RETRO-REFLECTING ELEMENT AND METHOD

Ludwig Eigenmann, Vacallo, Ticino, Switzerland

Filed Mar. 19, 1974, Ser. No. 452,996
Claims priority, application Italy, Mar. 21, 1973, 21913/73
Int. Cl.² G02B 5/126
U.S. Cl. 350—104 10 Claims




1. A substantially spherical reflecting element, comprising a transparent reflective body having a first portion bounded by a first surface section adapted to be impinged by rays from a source external to said body, a substantially part-spherical second portion, and a plurality of substantially part-spherical third portions projecting radially outwardly of said second portion and each bounded by a second surface section adapted to be impinged by rays from within said body; and a reflective material provided at least on some of said second surface sections, whereby a ray impinging said first surface section at an angle thereto is refracted into said body to pass therethrough in a first direction to one of said second surface sections to be reflected by said reflective material and to return through said body, in a second direction substantially opposite to said first direction, to said first surface section and ultimately towards said source, said body having substantially the same index of refraction throughout so that additional refractions and reflections within said body due to differential indices of refraction are substantially eliminated.

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3,964,821

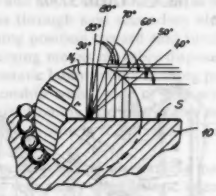
## REFLEX REFLECTING SYSTEM FOR ROAD SURFACE MARKING

Ludwig Eigenmann, Vacallo, Canton Ticino, Switzerland

Filed Dec. 27, 1973, Ser. No. 428,909
Claims priority, application Italy, Dec. 28, 1972, 33710/72
Int. Cl.² G02B 5/12
U.S. Cl. 350—105 14 Claims

1. A marked road, comprising a roadway pavement; and a traffic-regulating indicium provided on said pavement and including a layer of material having an upwardly facing surface the entire extent of which is approximately planar, said indicium further including reflective aggregates partially embedded in said layer, and at least one of said aggregates comprising a substantially spherical transparent element having an exposed portion projecting upwardly of said surface and another portion projecting downwardly from said surface into said layer, said element having an index of refraction such that rays impinging said exposed portion at large angles of incidence are at least partially refracted into said element, and said one aggregate further comprising a transparent binder

substance contacting said other portion of said element, and reflecting means for the reflection of rays refracted into said element associated with said other portion of said element and spaced from the same by said binder substance, said binder substance having an index of refraction which approximately



equals that of said element so that the reflex reflextivity of said one aggregate is reduced from that of similar units wherein the index of refraction of the spherical lens exceeds that of the binder while the total transparency parameter of said one aggregate is substantially increased over that of said similar units.

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**3,964,822**

## PROJECTION SCREEN AND PROCESS FOR PRODUCTION THEREOF

**Akira Yamashita, Iwakuni, Japan, assignor to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan**

**Filed Oct. 7, 1974, Ser. No. 512,994**

**Claims priority, application Japan, Oct. 12, 1973, 48-113872; Oct. 19, 1973, 48-116863**

**Int. Cl.² G03B *21/56, 21/60***

**U.S. Cl. 350—117** **6 Claims**

1. A projection screen which comprises:
a substrate having a metallic aluminum surface,
a transparent film overlaying said metallic aluminum surface,
said metallic aluminum surface having a fine, dense pattern of directional irregularities and a pattern of nondirectional craters provided thereon; and
said transparent film having a thickness of from 0.5 to 10 microns and a roughness expressed as a maximum height (R max) of from 0.2S to 25S.

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**3,964,823**

## ARTICLES EMPLOYING PHOTOCHROMIC MATERIALS

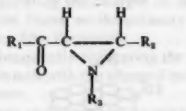
**Anthony Marion Trozzolo, Murray Hill, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Mar. 18, 1974, Ser. No. 451,839**

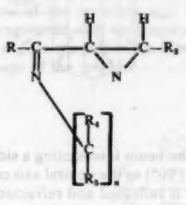
**Int. Cl.² G02B *5/23***

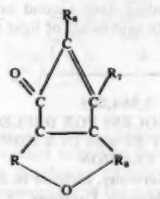
**U.S. Cl. 350—160 P** **14 Claims**

1. An optically sensitive article which includes at least one element containing photochromic material in which said article changes absorption characteristics at a wavelength range of a first radiation on exposure to a second radiation of a given wavelength range characterized in that the photochromic material is at least partially crystalline and partially crystallographically oriented and contained in an amorphous medium stress distorted to partially align the crystals of photochromic material consists essentially of cyclic aziridine compound with up to three cyclic rings which can be represented by an atomic formula selected from the group consisting of

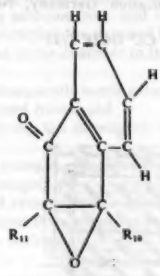


and





Bicyclic Oxirane



Tricyclic Oxirane

in which $R_1$ and $R_2$ are aromatic substituents with up to three rings, $R_3$ is a substituted or unsubstituted benzyl group, $R_4$ and $R_5$ are hydrogen or alkyl groups with up to 5 carbons, $n$ is from 1 to 5, whereby the change in the said absorption characteristic produced by the said second radiation is relatively large for one plane of polarization of the second radiation and the change in the said absorption characteristic is more pronounced for one plane of polarization of the first radiation.

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**3,964,824**

## LIGHT TRANSMITTER

**Robert L. Dixon, Rte. 1, Winchester, Tenn. 37398**

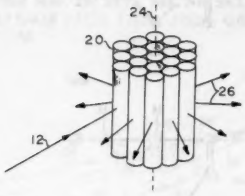
**Filed Oct. 3, 1974, Ser. No. 511,698**

**Int. Cl.² G02B *3/08***

**U.S. Cl. 350—190** **5 Claims**

1. A light transmitter comprising:

a supporting frame;
light source means supported by said frame for generating and projecting a collimated beam of light; and
a bundle of straight parallel lengths of fiber optics supported by said frame and spaced from said light source means, said bundle of fiber optics being positioned in the path of




said beam with the beam intersecting a side of the bundle of optics normal (90°) to the central axis of said bundle;
whereby the beam is reflected and refracted by surfaces of said fiber optics of said bundle in a substantially solid plane of light extending 360° around said bundle and being coincident with said beam of light from said light source means.

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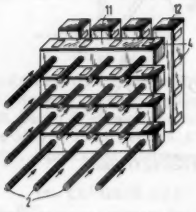
**3,964,825**

## APPARATUS AND PROCESS FOR DEFLECTING THE DIRECTION OF LIGHT BEAMS IN A CONTROLLABLE FASHION

**Hans Eschler, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany**

**Filed Nov. 27, 1974, Ser. No. 527,893**
**Claims priority, application Germany, Nov. 29, 1973, 2359556**
**Int. Cl.² G02F *1/33***
**U.S. Cl. 350—161** **9 Claims**



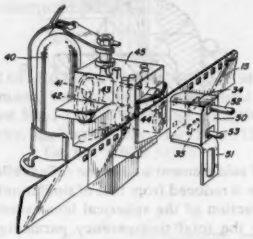

**1.** In an apparatus for handling light beams from a source of light beams, and including a plurality of acousto-optic light deflector units, the improvement comprising said plurality of light deflector units consisting of a matrix of transparent bodies, each body being provided with a piezoelectric transducer for each unit in the body to create a high frequency ultrasonic wave having a frequency range of between 30 and 200 MHz in each of the deflector units, the body for each unit having a shape so that the sound wave formed by the piezoelectric transducer is a standing sound wave running in a direction at right angles to the direction of the propagation of the light through the unit to create an optical phase grating in each deflector unit and the apparatus including beam-shaping means disposed between a plane and the matrix of light deflector units for focusing all of the beams deflected in the same direction to a spot on the plane.

**3,964,826**

## DUAL SOUND SYSTEM

**John S. Joseph, Los Alamitos, and Edwin B. Levinson, Tustin, both of Calif., assignors to Sundstrand Data Control, Inc., Redmond, Wash.**

**Filed Nov. 30, 1973, Ser. No. 420,684**
**Int. Cl.² G03B *31/02***
**U.S. Cl. 352—10** **6 Claims**




**1.** Scanning apparatus for longitudinally extending optical sound track on a movie film, comprising:
a lamp;
a body adjacent said lamp and having a bore therethrough to conduct a light beam from said lamp to said film;
a mask to establish the light beam dimension longitudinally of said sound track;
a lens carrier in said bore and movable longitudinally and rotationally thereof;
a lens carried by said carrier;
an actuating arm extending outwardly from said lens carrier through a hole in said body which is larger than the arm to accommodate a limited movement of the arm and carrier;
first adjusting means engaging the arm to move the carrier axially of the bore, adjusting the focus of the light beam on said sound track;
second adjusting means engaging the actuating arm at a point displaced from the engagement of the first adjusting means by 90° to rotate the carrier in said bore, orienting the light beam with respect to the sound track;
a spring urging said arm into engagement with the first and second adjusting means; and
means for receiving the light beam modulated by the optical sound track.

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**3,964,827**

## ION MODULATED IMAGE FORMING APPARATUS

**Hidetoshi Tanaka, Musashino; Toshiro Kasamura, Kawasaki, and Tadashi Sato, Kokubunji, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Nov. 19, 1974, Ser. No. 525,196**
**Claims priority, application Japan, Nov. 29, 1973, 48-134619**
**Int. Cl.² G03G *15/044***
**U.S. Cl. 355—3 R** **18 Claims**

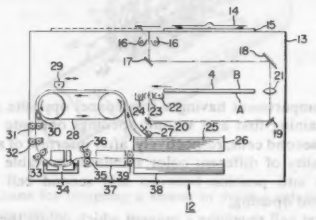
**8.** An ion modulation copying system comprising in combination,
a photosensitive screen supported in a plane and having a multitude of openings therein;
drive means for reciprocating said screen in said plane between a starting point and a turning point, wherein a secondary electrostatic latent image forming position is disposed between said starting and turning points;
means for forming a primary electrostatic latent image on said screen, said primary electrostatic latent image forming means being disposed between said starting point and said secondary electrostatic latent image forming position;

a chargeable member capable of bearing a secondary electrostatic latent image, said chargeable member being disposed for movement through said secondary electrostatic latent image forming position, in a spaced parallel relation with respect to the plane of said screen;

drive means for moving said chargeable member at the same speed and in the same direction as said screen as the latter moves through said secondary electrostatic latent image forming position toward said turning point;

corona discharging means movably disposed at said secondary electrostatic latent image forming position in spaced apart relationship with a side of said screen opposite to the side thereof facing said chargeable member, wherein said discharge means is for providing an ion source for modulation; and

drive means for driving said discharging means reciprocally through said secondary electrostatic latent image forming position between first and second points;



wherein said first point is nearer to said starting point and said second point is nearer to said turning point;

wherein said ion modulation is carried out between said first and second points during movement of said screen and said chargeable member in the direction from said first point to said second point and movement of said corona discharge means in the direction from said second point to said first point; and wherein (a) said drive means for driving said discharging means includes means for returning said corona discharge means from said first point to said second point, (b) said drive means for said screen includes means for returning said screen from said turning point to said second point, and (c) said drive means for said chargeable member includes means for moving a portion of said chargeable member at which a subsequent said secondary electrostatic latent image is to be formed to said second point, whereby a plurality of secondary electrostatic latent images can be formed from a single primary electrostatic image on said screen.

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**3,964,828**

## APPARATUS FOR PREPARING ELECTROPHOTOGRAPHIC MICROFILM

**Hiroshi Yamada, Ichikawa; Hisanori Ataka, and Yukio Shirai, Kawasaki, all of Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan**

**Filed Dec. 21, 1973, Ser. No. 427,240**

**Claims priority, application Japan, Dec. 29, 1972, 47-3743[U]**

**Int. Cl.² G03G *15/10***

**U.S. Cl. 355—10** **18 Claims**

1. A system for forming microfilm electrophotographic images of originals, comprising:

a pressure plate located at an imaging position;

means for delivering a length of film corresponding to one microfilm frame to the imaging position against the pressure plate;

an original receptacle and means for illuminating an original placed thereon;

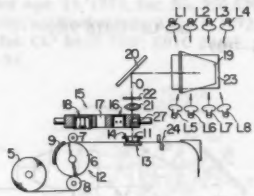
an optical system for focusing the light image of an original placed on the original receptacle onto the microfilm frame on the pressure plate;

a movable unit including a charger, an exposure window and developing means including a vessel of developing solution;

means for registering the charger of the movable unit with the microfilm frame on the pressure plate and for charging the microfilm therewith;

means for subsequently registering the exposure window of the movable unit with the charged microfilm frame on the pressure plate;

exposure means and means for causing the incidence of the original image on the microfilm frame through the exposure window of the movable unit while said exposure window is registered with the frame on the pressure plate to thereby expose the microfilm frame and form thereon a latent image of the original;



means for subsequently registering the developing means with the exposed microfilm frame, means for forming a liquid-tight developing chamber while the developing means is registered with the microfilm frame, one wall of said chamber being formed by the microfilm frame surface carrying the latent image, and means for introducing developing solution from said vessel into said chamber and for contacting the exposed frame with said developing solution in the chamber to thereby develop the latent image;

means for subsequently moving the movable unit away from the developed frame; and

means for fixing the developed image on the microfilm frame;

wherein the pressure plate and the microfilm frame which is in the imaging position extend along parallel vertical planes and remain in fixed positions in their respective vertical planes throughout the period in which said microfilm frame is charged, exposed, developed and fixed.

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**3,964,829**

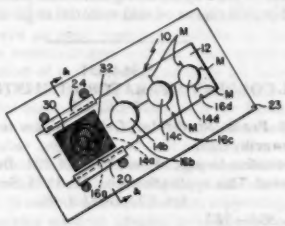
## COIN PHOTOGRAPHIC APPARATUS

**Richard H. Munis, Sawnee Bean Road, Thetford Center, Vt. 05075**

**Filed Mar. 18, 1974, Ser. No. 451,946**

**Int. Cl.² G03B *27/62***

**U.S. Cl. 355—75** **13 Claims**



1. Coin photographic apparatus comprising;

support means for a coin having means for receiving the coin in a predetermined position,
a light source for directing light onto the coin,
a camera positioned on the same side of said support means as said light source,
a grid disposed intermediate the light source and support means for establishing light contours on the coin that are photographed by the camera,
and means for supporting the grid over the coin in a fixed position relative to the coin so that each time a particular type of coin is photographed the coin and grid are maintained in the same relative position.

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**3,964,830**

**METHOD FOR INSPECTING FLAWS OF MATERIAL**

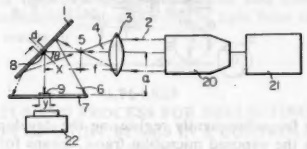
**Hiroyuki Ikeda, Yokohama, and Takefumi Inagaki, Kawasaki, both of Japan, assignors to Fujitsu Ltd., Japan**

**Filed Mar. 27, 1974, Ser. No. 455,369**

**Claims priority, application Japan, Mar. 30, 1973, 48-36372**

**Int. Cl.² G01B 9/02**

**U.S. Cl. 356—109** **9 Claims**




1. A method for inspecting flaws in material, comprising the steps of:
a. directing a parallel beam generated from a source of a coherent wave of light through a spherical lens;
b. forming a cone-shaped coherent spherical wave of light by focusing said parallel beam to a focal point of said spherical lens;
c. positioning said material in a manner to provide intersection of said cone-shaped coherent spherical wave of light and a region of said material at a predetermined distance from said focal point, said region of said material on which said cone-shaped coherent spherical wave of light impinges being substantially larger than the size of said flaws to be inspected;
d. positioning an inspection screen at a predetermined distance from said material to intersect light reflected from said region in order that a Fresnel diffraction pattern of microflaws to be inspected becomes an observable size; and,
e. observing said inspection screen with regard to whether or not said distribution of said light reflected from said region includes a Fresnel diffraction pattern of said microflaws thereby enabling detection of said microflaws within said region of said material to be inspected.

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**3,964,831**

**VISUAL COLOR COMPARATOR WITH INTEGRAL DUAL DIP CELLS**

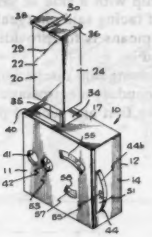
**Gomer S. Frank, Northridge, Calif., assignor to Aquality, Inc., Chatsworth, Calif.**

**Continuation-in-part of Ser. No. 428,421, Dec. 26, 1973, abandoned. This application Aug. 25, 1975, Ser. No. 607,282**

**Int. Cl.² G01J 3/48**

**U.S. Cl. 356—182** **8 Claims**

1. A visual color comparator for testing a property of a liquid comprising:
first and second dip cells;
means for rigidly connecting said cells together in side by side location with a space therebetween;
a housing compartment for said cells;
an aperture in said compartment through which said cells are inserted together after being simultaneously dipped into said liquid to fill said cells;
guide means on said compartment and inserted into said space to guide the movement of said cells;




said compartment having a front panel opposite said cells containing first and second openings opposite said first and second cells, respectively, after insertion of said cells;
a plurality of different color standards movable one at a time into position between said second cell and said second opening;
said first cell receiving a reagent which colors the liquid in said cell and said color standards being moved until a standard matches the liquid color.

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**3,964,832**

**GEL COMPOSITION AND ADHESIVE STICK**

**Norman B. Cohen, Wayland, and Donald J. Lennon, Acton, both of Mass., assignors to The Carter's Ink Company, Cambridge, Mass.**

**Filed June 17, 1974, Ser. No. 479,801**

**Int. Cl.² B43K 21/08**

**U.S. Cl. 401—75** **29 Claims**

1. A remeltable adhesive composition comprising:
a metal salt of an aliphatic carboxylic acid having from 8 to 36 carbon atoms, the metal portion of said metal salt being selected from the group consisting of Group II metals and Group III metals;
a liquid dispersant;
a water soluble chelating agent in an amount sufficient to chelate the metal portion of the carboxylic acid salt to render the carboxylic acid salt soluble in the liquid dispersant;
and, a polyvinylpyrrolidone adhesive having a molecular weight between the range of 40,000 to 360,000.

5. An adhesive stick applicator comprising: a remeltable adhesive composition comprising;
a metal salt of an aliphatic carboxylic acid having from 8 to 36 carbon atoms, the metal portion of said metal salt being selected from the group consisting of Group II metals, and Group III metals,
a liquid dispersant,
a water soluble chelating agent in an amount sufficient to chelate the metal portion of the carboxylic acid salt to render the carboxylic acid salt soluble in the liquid dispersant, and
a polyvinylpyrrolidone adhesive having a molecular weight between the range of 40,000 to 360,000; a relatively vapor impermeable housing enclosing said adhesive composition; and,
means to expose said adhesive composition enclosed in said housing to enable said adhesive composition to be applied onto a substrate.

9. A composition suitable for use as a gel carrier comprising a metal salt of an aliphatic carboxylic acid having from 8 to 36 carbon atoms, the metal portion of said metal salt being selected from the group consisting of Group II metals and Group III metals, a liquid dispersant and a water soluble chelating agent in an amount sufficient to chelate the metal portion of the carboxylic acid salt to render the carboxylic acid salt soluble in the liquid dispersant.

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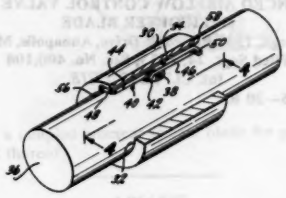
3,964,833

## KEYED RETAINER

Ralph F. Manriquez, San Jose, Calif., assignor to The Singer Company, New York, N.Y.

Filed May 21, 1975, Ser. No. 579,344
Int. Cl.² F16D 1/06
U.S. Cl. 403—357 3 Claims



1. A means for coupling a sleeve in driving relationship to a shaft comprising:

a blind hole in said shaft,

longitudinal keyway means in said sleeve,

a spring means of substantially uniform cross-section comprising loop means formed centrally thereof insertable in said blind hole and provided with a pair of oppositely extending arms disposable in said keyway means, and

preformed tab means on said arms arranged to extend generally tangentally of the circumference of said shaft,

said keyway means being of a width sufficient to receive said tab means to permit disposition of said arms and tab means between said shaft and sleeve and to permit removal thereof without destruction,

said loop means, when inserted in said blind hole couple said sleeve and shaft circumferentially and said tab means engaging said sleeve, together with said loop means, position said sleeve longitudinally on said shaft.

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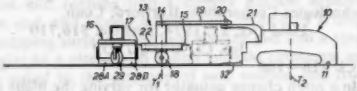
3,964,834

## APPARATUS FOR COMPACTING OR CONSOLIDATING A FRESHLY SURFACE STRIP

Michel Paramythioti, Chantilly; Emmanuel R. De La Sayette, Neuilly, and Jacques J. Girard, Gouvieux, all of France, assignors to Albaret S.A., Rantigny, France

Filed Jan. 27, 1975, Ser. No. 544,513
Claims priority, application France, Feb. 1, 1974, 74.03366
Int. Cl.² E01C 19/00
U.S. Cl. 404—84 18 Claims



1. Apparatus for compacting or consolidating a surfaced strip, said apparatus comprising a self-propelled compacting machine having steering means for controlling the direction of movement of said machine, a guide vehicle displaceable along a strip in association with said compacting machine, means operatively associating said compacting machine with said guide vehicle for displacement along a strip with said guide vehicle; and means including a guide member on said guide vehicle for guiding said compacting machine along a path of travel about a vertical axis defined by a portion of said guide vehicle, and sensing means on said compacting machine cooperating with said guide member for indicating variations in the radial distance between said compacting machine and said guide member; automatic control means connected to said steering means and said sensing means and responsive to said sensing means for controlling the position of said steering means, thereby automatically adjusting the direction of movement of said compacting machine in response to variations in said radial distance.

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3,964,835

## DEVICE FOR FORMING MARKING STRIPES ON ROAD SURFACES

Ludwig Eigenmann, Vacallo, Canton Ticino, Switzerland

Filed Apr. 13, 1973, Ser. No. 350,830
Claims priority, application Italy, Apr. 15, 1972, 23179/72
Int. Cl.² B01F 7/00; E01C 23/16
U.S. Cl. 404—94 17 Claims

1. A road-marking device, comprising a vehicle for displacement over a road surface; container means mounted on said vehicle and including at least two compartments for separately confining different viscous components of a composition to be applied over the road surface; mixing means on said vehicle for mixing said viscous components so as to form said composition prior to application of the latter over the road surface, said mixing means comprising a mixing chamber having a downwardly facing outlet and located below and adapted to communicate with said compartments so as to permit descent of said viscous components into said mixing chamber by gravity, and said mixing means further comprising a rotary elongated mixer mounted for axial displacement in said mixing chamber and having a plug member at an end of said elongated mixer adjacent said outlet for closing the same when said mixer is stationary, said mixer having helically-arranged screw flights each having an inclined bottom surface extending generally radially in a sense away from said outlet, said inclined bottom surfaces being operative for pushing said mixer axially away from said outlet so as to open the same and permit the ejection of the resulting viscous composition as a function of the reaction force exerted by said viscous composition upon the inclined bottom surfaces during rotation of said mixer; a receptacle mounted on said vehicle below said outlet for receiving said composition and including a member movable between an open position in which the interior of said receptacle communicates with the road surface so as to permit application of said composition over the latter and a closed position, said receptacle having a trailing wall and also including doctor blade means on said wall for forming from said composition a layer of predetermined thickness over the road surface after application of said composition over the latter, said doctor-blade means including means for adjusting the vertical position thereof with respect to the road surface; support means on said vehicle for rotatably supporting at least one strip of marking material adapted to be applied over said layer; guide means for guiding said strip during application thereof over said layer; and pressure roller means positioned

on said vehicle upstream of said receptacle as considered with respect to the direction of displacement of said vehicle over the road surface so as to pass over said composition subsequent to formation of said layer over the road surface.

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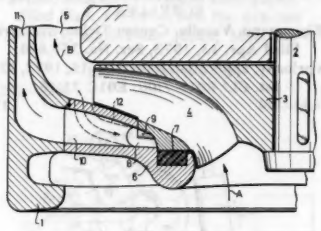
**3,964,836**

## METHOD OF PUMPING LIQUID WITH A SUBMERGED ROTARY PUMP AND PUMP FOR CARRYING OUT THE METHOD

**Olav Rasmusson Navelsaker, Oslo, Norway, assignor to Thune-Eureka A/S, Oslo, Norway**

**Filed Feb. 5, 1974, Ser. No. 439,764**
**Claims priority, application Norway, July 5, 1973, 2765/73**
**Int. Cl.² F01D *25/00*; F04B *47/06***
**U.S. Cl. 415—1** **6 Claims**



**1.** Method of pumping liquid by a submerged rotary pump that has an impeller that rotates about a vertical axis, said impeller having a pressure side to which said impeller delivers liquid upon rotation of said impeller, comprising rotating said impeller to pump the liquid up through a riser pipe until the liquid level has sunk to the pump, and thereafter causing the liquid in the riser pipe to pass down in bypass relation to the pump and into and up through a relatively narrow pipe which leads from the pump housing while continuing to rotate the impeller, thereby using the rotating impeller as check valve for the liquid.

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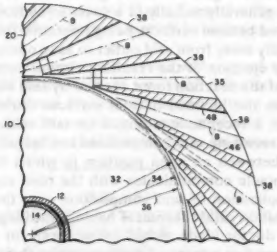
**3,964,837**

## ECCENTRIC PASSAGE PIPE DIFFUSER

**John T. Exley, Milford, Conn., assignor to Avco Corporation, Stratford, Conn.**

**Filed Jan. 13, 1975, Ser. No. 540,601**
**Int. Cl.² F04D *21/00*, *29/42***
**U.S. Cl. 415—181** **7 Claims**



**1.** A diffuser whose inner periphery closely surrounds the impeller output stage of a radial flow centrifugal compressor having a capability for delivering a compressible fluid at supersonic velocity, said diffuser comprising:

an annular entrance space for receiving the fluid discharged from said impeller, said entrance space being formed by spaced apart walls aligned respectively with the front shroud and rear hub of the impeller;

a plurality of intersecting passages extending outwardly from said annular entrance space, in a tangential direction from the inner periphery of said diffuser, each of said passages being of curvilinear cross section with an entrance throat, the centerline of said throat being stepped, said throat being contoured to match the velocity vector profiles of fluid particles delivered by said impeller, and having in the region downstream of said entrance throat an area of expanding cross section extending toward the exhaust end of said passage; and

an external annulus for collecting the pressurized fluid delivered by the multiplicity of said passages.

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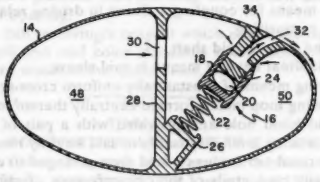
**3,964,838**

## BALANCED AIRFLOW CONTROL VALVE FOR HELICOPTER BLADE

**John D. Spargo, 1511 Riverdale Drive, Annapolis, Md. 21401**

**Filed Sept. 24, 1973, Ser. No. 400,108**
**Int. Cl.² B64C *27/18***
**U.S. Cl. 416—20 R** **6 Claims**



**1.** A hollow airfoil;

a fluid passage means longitudinally of the surface of said airfoil and communicating with its interior;

said passage means including opposed interior openings along its length and a guide member, and fluid pressure balanced valve means;

said valve means including an U-shaped member slidable axially of said passage means;

means controlling operation of said U-shaped member for controlling flow through said passage means.

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**3,964,839**

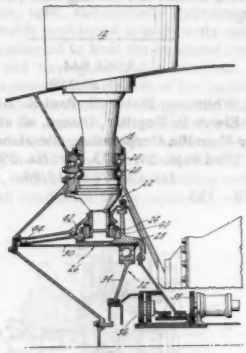
## PITCH CHANGE MECHANISM

**Edward H. Kusiak, Longmeadow, Mass., assignor to United Technologies Corporation, Hartford, Conn.**

**Filed Oct. 21, 1974, Ser. No. 516,710**
**Int. Cl.² B64C *11/32***
**U.S. Cl. 416—160** **4 Claims**

**1.** In a pitch change actuator for varying the blade angle of a blade of a rotor wherein the pitch change actuator is adapted for mounting in said rotor and has a harmonic drive unit including a rigid spline rotatable in one direction and a flexispline rotatable in an opposite direction, the improvement which comprises first means for interconnecting said rigid spline and said blade for travel in said one direction and second means for interconnecting said flexispline and said blade

for travel in said opposite direction, said first and second means simultaneously imparting by said rigid spline and said



flexispline a coupled moment to said blade for pitch change movement thereof.

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**3,964,840**

**BLADE FOR A CENTRIFUGAL PUMP IMPELLER**

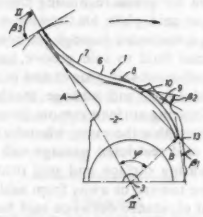
**Eduard Kamelmacher, 8 Brook Lane, Bexley, Kent, England**

**Filed Dec. 30, 1974, Ser. No. 537,376**

**Claims priority, application United Kingdom, Jan. 11, 1974, 1521/74**

**Int. Cl.² F01D *5/22***

**U.S. Cl. 416—183** **10 Claims**



1. A blade for a centrifugal impeller and rotatable about a blade rotational axis comprising a pressure end or blade tip lying on a first radius about said blade rotational axis, a suction end opposite to said pressure end on a second radius about said blade rotational axis angularly spaced from said first radius with said second radius leading in the direction of intended blade rotation and inclined towards said blade rotational axis from one side of said blade to the other side of said blade and a pumping surface lying between said pressure end and said suction end including a concave portion adjacent said pressure end running into a convex portion adjacent said suction end, and having a first angle defined by a tangent to said pumping surface at its said suction end and a tangent at this point to a circle with center on said rotational axis and radius equal to the distance of said suction end from said rotational axis in the range 25°–90°, a second angle defined by a tangent to said pumping surface at the beginning of said inclination of said suction end of the blade and a tangent at this point to a circle with its center on said rotational axis and radius equal to the distance of said beginning of said inclination from said rotational axis in the range 15°–35° but smaller than said first angle and a third angle defined by a tangent to said pumping surface of said blade at its pressure end and a tangent at this point to a circle with its center on said rotational axis and a radius equal to the distance of said pressure end of said blade from said rotational axis in the range 60°–100°.

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**3,964,841**

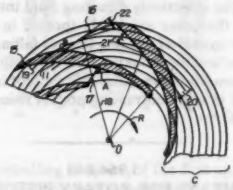
**IMPELLER BLADES**

**Oldrich Strycek, Bratislava, Czechoslovakia, assignor to Sigma Lutin, Narodni Podnik, Lutin, Czechoslovakia**

**Filed Sept. 18, 1974, Ser. No. 507,211**

**Int. Cl.² F01D *5/04***

**U.S. Cl. 416—186 R** **2 Claims**



1. In a blade for a multi-blade rotary impeller of a hydrodynamic pump, fan or the like, comprising a curved pressure surface and a curved suction surface tapering at each end to meet in a trailing and leading edge, the improvement wherein the angles of inclination forming the curvature of the pressure surface increase gradually to a maximum value from the leading edge to a first point from which they thence decrease toward the trailing edge, the angles of inclination forming the curvature of the suction surface gradually decrease to a minimum value from the leading edge to a second point from which they thence increase toward the trailing edge, said first point being the point at which a first logarithmic spiral of said blade, running from the trailing edge of the adjoining blade on the pressure side and crossing the blade channel, intersects said pressure surface, and said second point being the point at which a second logarithmic spiral of said blade, running from the leading edge of the adjoining blade on the suction side and crossing the blade channel, intersects said suction surface.

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**3,964,842**

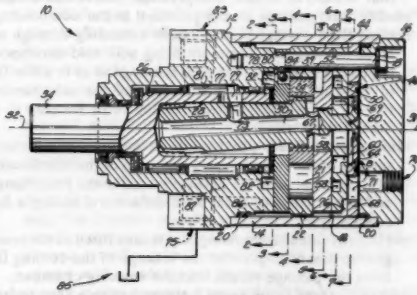
**HYDRAULIC DEVICE**

**Hollis N. White, Jr., West Lafayette, Ind., assignor to TRW Inc., Cleveland, Ohio**

**Filed Jan. 20, 1975, Ser. No. 542,574**

**Int. Cl.² F01C *1/02*; F03C *3/00*; F04C *1/02***

**U.S. Cl. 418—15** **6 Claims**



1. A hydraulic device comprising an internally toothed first gear and an externally toothed second gear eccentrically located within said first gear, means supporting said gears for relative rotary and orbital movement, the number of teeth of said second gear being one less than the number of teeth on said first gear, the form of the gear teeth of said first and

second gears being such that relative rotary and orbital movement occurs while said gears are supported and guided by the meshing teeth thereof, the gear teeth of said first and second gears defining pockets which expand from a minimum volume to a maximum volume and then contract to said minimum volume upon relative rotational and orbital movement thereof, commutation valve means for connecting said expanding pockets with one side of a fluid pressure system and for connecting said contracting pockets with the other side of the fluid pressure system in synchronism with said relative rotary and orbital movement of said first and second gears, said commutation valve means including means for directing fluid to and from said pockets from one axial side thereof, and valve means for selectively directing fluid into any expanding pocket from the other axial side thereof in response to the fluid pressure in said expanding pocket falling below a predetermined level and for blocking fluid flow out of any contracting pocket from said other axial side thereof in response to the fluid pressure in said contracting pocket rising above a predetermined level.

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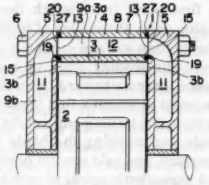
**3,964,843**

## SEAL MEANS FOR ROTARY PISTON ENGINE

**Yasuto Terazawa, and Fumio Imamaru, both of Hiroshima, Japan, assignors to Toyo Kogyo Co., Ltd., Japan**

**Filed Dec. 31, 1974, Ser. No. 537,822**
**Claims priority, application Japan, Jan. 14, 1974, 49-7640**
**Int. Cl.[2] F01C** *19/00, 21/06;* **F02B** *53/00;* **F02F** *11/00*
**U.S. Cl. 418—83** **17 Claims**



**1.** In a rotary piston internal combustion engine comprising a casing having a rotor housing provided with a trochoidal inner peripheral wall surface and a pair of side housings sealingly secured to the opposite sides of the rotor housing;

a polygonal rotary piston disposed in said casing for planetary revolution and rotation so as to define working chambers between the casing and the rotor, each of said working chambers being variable in volume during the planetary motion of said rotary piston to thereby perform four strokes of intake, compression, power and exhaust;

cooling fluid passage means provided in the side housings;

cooling fluid passage means axially extending through said rotor housing and communicating with said corresponding passage means in the side housings so as to allow flow of cooling fluid to pass from one of the side housings through said passage means in the rotor housing to the other side housing;

sealing grove means provided on at least one of the mating surface of the rotor housing and each of the side housings at an area between the passage means in the rotor housing and the inner peripheral wall surface and having a form of an ellipse;

the improvement comprising seal means fitted in the sealing groove means to prevent the leakage of the cooling fluid from the passage means into the working chamber;

said seal means being a seal member having a heat-resistant rubber body to prevent the leakage of the cooling fluid from the passage means to the working chamber;

a first backup layer made of synthetic resin having less elasticity than the seal member and provided on the outer peripheral face of the seal member, which face is directed toward the cooling fluid passage of the rotor housing; and

a second backup layer made of metal plate having less elasticity than the first backup layer and provided on the outer peripheral face of the first backup layer, which face is directed toward the cooling fluid passage of the rotor housing.

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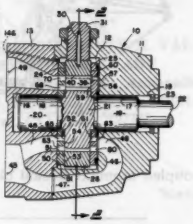
**3,964,844**

## VANE PUMP

**Charles H. Whitmore, Plainwell; Paul K. Houtman, Kalamazoo, and Elwyn E. Engelter, Otsego, all of Mich., assignors to Parker-Hannifin Corporation, Cleveland, Ohio**

**Filed Sept. 24, 1973, Ser. No. 399,854**
**Int. Cl.[2] F04C** *15/00*
**U.S. Cl. 418—133** **24 Claims**



**1.** In a vane pump having a housing with a pumping chamber intersected by inlet and outlet ports and a rotor in the chamber for conducting fluid from the inlet to the outlet when rotated and for pressurizing the fluid so conducted to the outlet, and a side plate between a side of the rotor and a wall of the housing, the improvement that comprises means providing a pressure area on the side of the plate next to said wall, passage means for conducting a portion of said pressurized fluid to said area for pressure biasing the plate toward said rotor, a groove in said plate on the side next to said rotor, means including a restricted passage for conducting a portion of said pressurized fluid to said groove, said plate having a bearing surface adjacent said groove and in close proximity to said side of said rotor, and passage means leading from a portion of said bearing surface remote from said groove to a low pressure zone within the pump whereby fluid entering said groove through said restricted passage will leave said groove between said bearing surface and said rotor and will permit the plate to move toward or away from said rotor to establish a predetermined clearance between said bearing surface and rotor when the fluid pressure forces acting on both sides of the plate on said area and on said groove and bearing surface are balanced; said restricted passage having a flow capacity and consequent pressure drop effective to vary the fluid pressure in said groove upon variance of said predetermined clearance to thereby unbalance said fluid pressure forces for moving said plate toward or away from said rotor owing to flow of fluid from said groove being greater than or less than the flow of fluid through said predetermined clearance.

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**3,964,845**

## APPARATUS FOR REPAIRING CONDUCTOR INSULATION

**Thomas W. Duggan, and Richard P. McNerney, both of Houston, Tex., assignors to Schlumberger Technology Corporation, New York, N.Y.**

**Filed Dec. 26, 1974, Ser. No. 536,381**
**Int. Cl.[2] B29F** *1/10*
**U.S. Cl. 425—13** **22 Claims**

**1.** Apparatus for repairing insulation of an insulated conductor, which comprises:

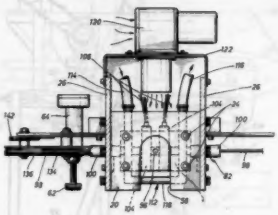
a. a split yoke comprising first and second plates, at least one of said plates being movable relative to the other of

said plates, said first and second plates having mating surfaces defining a molding zone;

b. an elongate, substantially cylindrical cavity formed in the mating surfaces of said first and second plates;

c. an elongate, split, substantially cylindrical conductor mold removably positioned in said cavity, said conductor mold being adapted to hold the insulated conductor during repair and having an inside diameter substantially equal to the original dimensions of the insulated conductor, said conductor mold including a central area corresponding to the area of the insulated conductor being repaired and end areas outside the central area;

d. an opening in said conductor mold for the introduction of insulator, said opening communicating with the area of the insulated conductor being repaired;



e. an injection bore through one of said plates, one end of said injection bore terminating adjacent said opening in said conductor mold;

f. injection molding means communicating with said injection bore to inject insulator into said conductor mold through said injection bore and opening;

g. means for moving at least one of said plates relative to the other of said plates to bring said plates into a closed molding position and an open position for removal of said conductor mold from said cavity;

h. heater means within said yoke to melt said insulator over only an area comprising the central area of said conductor mold; and

i. cooling means within said yoke to cool only the end areas of said conductor mold while said central area is heated, whereby the heat applied to insulated conductor within said conductor mold does not extend to insulated conductor outside the molding zone.

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**3,964,846**

## APPARATUS FOR MANUFACTURE OF POWER TRANSMISSION BELTS

**Robert H. Bliss, Denver, Colo., assignor to The Gates Rubber Company, Denver, Colo.**

**Division of Ser. No. 95,171, Dec. 4, 1970, abandoned. This application May 7, 1973, Ser. No. 357,766**

**Int. Cl. B29d** *29/00;* **B29c** *17/00;* **B29h** *7/22*

**U.S. Cl. 425—28 B** **3 Claims**

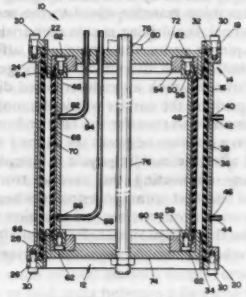
1. An apparatus for molding a power transmission belt sleeve having a tensile reinforcement disposed therein, comprising:

an inner cylindrically continuous flexible diaphragm that defines an inner mold surface;

an outer cylindrically continuous diaphragm that defines an outer mole surface, the inner and outer diaphragms radially spaced from and substantially concentric with each other for sandwiching the belt sleeve;

first pressure means for radially expanding the inner diaphragm out against the belt sleeve and applying outward radial pressure to mold that portion of the belt sleeve inward of the tensile reinforcement while tensioning the reinforcement;

second pressure means for radially contracting the outer diaphragm against the belt sleeve and applying inward radial pressure to mold that portion of the belt sleeve outward of the tensile reinforcement; and



means for controlling pressure of the first and second pressure means for maintaining pressure of the first pressure means greater than the pressure of the second pressure means for maintaining tension reinforcement.

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**3,964,847**

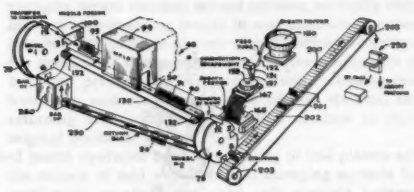
## CONTINUOUS AUTOMATED PLASTIC MOLDING APPARATUS

**Wilbert Redmer, Boca Raton; Kenneth Rolin, Del Ray Beach, and Herman Nittel, Boca Raton, all of Fla., assignors to Abbott Laboratories, North Chicago, Ill.**

**Filed Apr. 7, 1972, Ser. No. 241,934**

**Int. Cl.² B29D** *3/00*

**U.S. Cl. 425—125** **3 Claims**



1. In an apparatus for molding including a molding machine having mold sections for receiving a mold core or insert, said apparatus comprising:

a carrier having a mold core or insert supporting means thereon for presenting the mold core or insert to the mold in said molding machine;

a first rotatable, indexable, trunnion transfer wheel positioned on a first side of said molding machine and having a plurality of carrier receiving positions on the periphery thereof, said first transfer wheel receiving and transferring said carrier to various positions around the periphery thereof;

a second rotatable, indexable, trunnion transfer wheel positioned on a second side of said molding machine opposite said first trunnion transfer wheel and having a plurality of carrier receiving positions on the periphery thereof, said second transfer wheel receiving and transferring said carrier with molded parts thereon;

conveyor means separate from said trunnion transfer wheels positioned in relation to said first trunnion transfer wheel, molding machine, and second trunnion transfer wheel for transporting the carrier from the first transfer wheel to the mold in the molding machine to the second transfer wheel, said conveyor means comprising an endless chain revolving about a pair of opposed sprockets, one each of

said sprockets positioned adjacent each of said trunnion transfer wheels;

driving means for moving said conveyor means to advance the carrier to and away from said molding machine from the first trunnion transfer wheel to the second trunnion transfer wheel, the driving means comprising engageable rack and pinion gears, the pinion gear affixed to one of the sprockets and an air cylinder in engagement with the rack to drive the rack a predetermined distance, preselected to position the carrier within the mold in the molding machine and to transfer the carrier from the molding machine to a position adjacent the second trunnion transfer wheel after the molding cycle is completed; and

return means connecting the second trunnion transfer wheel and the first trunnion transfer wheel for transferring the carrier from the second trunnion transfer wheel back to the first trunnion transfer wheel after the molded parts have been removed from the carrier.

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**3,964,848**

## CALENDERING OF SYNTHETIC PLASTICS FILM

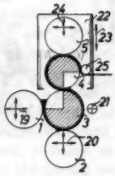
**Willi Wockener, Hannover-Kleefeld, Germany, assignor to Hermann Berstorff Maschinenbau GmbH, Hannover-Kleefeld, Germany**

**Filed Sept. 13, 1974, Ser. No. 505,913**

**Claims priority, application Germany, Sept. 15, 1973, 2346543**

**Int. Cl.² B29D 7/14**

**U.S. Cl. 425—224** **2 Claims**




1. In a five-roll calendar for calendering synthetic plastics film an arrangement of said five-rolls such that a third calender roller of said five-roll calender co-operates with a laterally preceding first calender roller, set at the same height as said third calender roller, to form a first working roller gap, and cooperates with a second calender roller disposed beneath said third calender roller to form a second working roller gap, and cooperates with a fourth calender roller disposed above said third calender roller to form a third working roller gap, and said fourth calender roller co-operates with a fifth calender roller to form a fourth roller gap, a pull-off roller cooperating with said fourth calender roller to form a fifth roller gap located three-quarters of the circumference of said fourth calender roller from said third roller gap, the arrangement being such that said film is looped around three-quarters of the circumference of said third calender roller and three-quarters of the circumference of said fourth calender roller before being pulled off said fourth roller.

**3,964,849**

## MOLD APPARATUS FOR CONTINUOUSLY PRODUCING LAMINATED RESINOID MATERIAL

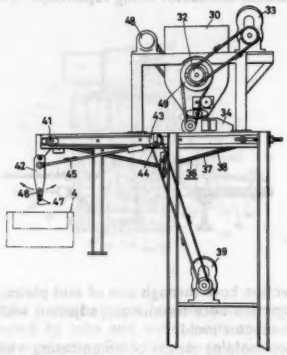
**Heijiro Fukuda, No. 123, 3-chome, Umegaoka, Nagaokakyo Kyoto, Japan (617)**

**Division of Ser. No. 494,015, Aug. 1, 1974. This application Apr. 23, 1975, Ser. No. 570,982**

**Claims priority, application Japan, Oct. 9, 1973, 48-113718; Oct. 9, 1973, 48-113720; Oct. 9, 1973, 48-117761[U]; Mar. 18, 1974, 49-31284**

**Int. Cl.² B29D 7/02**

**U.S. Cl. 425—224** **2 Claims**




1. In an apparatus for feeding a powdery to granular resinoid abrasive composition having a belt conveyor having a conveying surface, a feed means disposed above the rear end of the conveyor surface of the belt conveyor and including a crasher, and a pivotally movable feeding tube provided at the front end of the belt conveyor, the improvement comprising:

means for intermittently driving the belt conveyor for a predetermined period of time;

a pair of walls provided at opposite lateral sides of the conveying surface of the belt conveyor for regulating the abrasive composition to be fed to a predetermined width; and

slitter means provided at the rear end of said conveying surface of the belt conveyor and positioned at an adjustable specified level thereabove between the pair of walls for regulating the abrasive composition to be fed to a predetermined height onto the conveying surface.

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**3,964,850**

## THERMOPLASTIC SHEET PRESSURE FORMING MACHINE

**Frank Carnegie, Jr., Montville, N.J., assignor to Camid Intermatic, New York, N.Y.**

**Filed Nov. 27, 1974, Ser. No. 527,587**

**Int. Cl.² B29C 3/06, 5/06**

**U.S. Cl. 425—292** **9 Claims**

1. A forming apparatus for molding thermoplastic sheet material comprising:

a. a base,

b. a platen and mold plate assembly on said base, said platen and mold plate assembly being openable and closeable relative to each other,

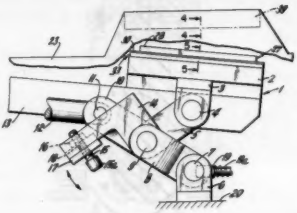
c. said mold plate assembly being provided with at least one forming mold section, a flexible member of elastic material attached as part of said mold plate assembly and forming at least a partial border around the lower portion of said forming mold section, a seal-off plate slidably mounted on said mold plate assembly and defining a

peripheral outline and projecting upwards from said forming section and resting on said elastic material,

d. transport means mounted on said base for bringing said mold plate assembly into and out of said closed relationship with said platen when a sheet of thermplastic sheet material is positioned therebetween and held in a sealed relation with said base plate assembly by said seal-off plate.

e. cutting means carried by said mold plate assembly and defining a peripheral outline of the portion of the thermoplastic sheet to be cut, said cutting means being recessed below said seal-off plate except when said seal-off plate is pushed into said flexible member;

f. limiting means associated with said platen and mold plate assembly for limiting said closed relationship between



platen and mold plate assembly to a point where the seal-off plate holds the thermoplastic sheet in a sealed relation to said mold plate assembly without said seal-off plate being depressed into said elastic material,

g. pressure means associated with said platen and mold plate assembly for applying pressure to said thermoplastic sheet, first to hold the sheet against the platen, then to move the thermoplastic sheet into said forming section, and

h. retracting means connected to said limiting means for retracting said limiting means permitting a full closure of said closed relation thereby depressing said seal-off plate into said elastic material and thereby exposing the cutting means to cut the formed article from said thermoplastic sheet.

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**3,964,851**

## APPARATUS FOR CURING ELONGATE WORKPIECES

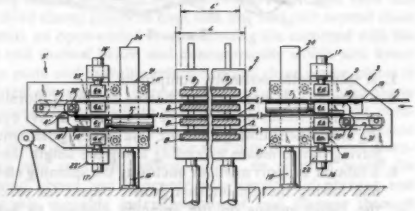
**Hendrikus-Johannes Bongers, Eindhoven, Netherlands, assignor to G. Siempelkamp & Co., Krefeld, Germany**

**Filed Aug. 27, 1975, Ser. No. 608,347**

**Claims priority, application Germany, Aug. 27, 1974, 2441081**

**Int. Cl.² B29C *3/00, 17/02***

**U.S. Cl. 425—324 R** **10 Claims**



**1. An apparatus for curing a web of polymeric material, comprising:**

**a press with a stack of heated platens, including a top platen, a bottom platen and at least one intermediate platen, forming a plurality of superposed curing stages between them;**

**a pair of stretching stations flanking said press, each of said stations being provided with web-engaging means for leading a web in several passes through said stations and said stages, said web-engaging means including a clamping section in each of said stations and a deflecting section in at least one of said stations, said clamping section being provided with at least a top jaw and an intermediate jaw at one station and with at least an intermediate jaw and a bottom jaw at the other station substantially aligned with said platens for bracketing at least the outermost passes of said web entering and leaving said stages, at least one of said sections of said web-engaging means at each of said web-engaging means at each of said stations being horizontally movable relatively to said press for stretching said web upon a gripping of at least one pass thereof by said clamping section, said web-engaging means at each of said stations being vertically shiftable relatively to said press between a first and a second position, said web-engaging means in said first position holding said passes at levels substantially midway between confronting surfaces of an associated platen pair in an open state of the press, said web-engaging means in said second position holding each of said passes onto a surface of the associated platen pair in said open state of the press;**

**intermittently operable actuating means for operating said clamping section at each of said stations to grip said web in said first position with the press in its open state, displacing said horizontally movable sections at said stations away from each other to stretch the passes of said web spacedly extending between said platens, vertically shifting said web-engaging means at each of said stations from said first position to said second position, thereupon closing said platens on the passes of said web with a vertical motion opposite that of the shifting of said web-engaging means into said second position, vertically shifting said web-engaging means in said opposite direction into said first position at each of said stations, reopening the press after the curing of web portions subjected to heat and pressure between said platens, releasing said web from said clamping at each of said stations, and returning said horizontally movable sections to their original positions; and**

**feed means operative upon a reopening of said platens and the release of said web from said clamping sections for positioning previously uncured web portions between said platens.**

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**3,964,852**

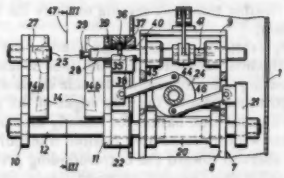
## DEVICE FOR PRODUCING HOLLOW BODIES OF THERMOPLASTIC MATERIAL

**Wilhelm Marfiewicz, Berlin, Germany, assignor to Emil Korsch Spezialfabrik fur Komprimiermaschinen, Germany**

**Filed Sept. 30, 1975, Ser. No. 618,112**

**Int. Cl.² B29D *23/03***

**U.S. Cl. 425—326 B** **8 Claims**



**1. In a device for producing hollow bodies of thermoplastic material, of the type including a multi-part hollow mold mounted in a closure assembly, having a frame and movable**

in a housing between a blow station and a plasticating unit, on relatively movable mold platens carried by two supporting bars extending below the hollow mold in the closure assembly, the improvement comprising a locking mechanism provided on the upper parts of the mold platens, said locking mechanism comprising, in combination, a locking bush firmly secured to one mold platen; and a locking rod rotatably mounted in the other mold platen but fixed against axial displacement relative thereto; said locking rod having a lock head, designed as a symmetric hammer head, adapted to lockingly engage said locking bush; said locking bush having an opening conformable to said hammer head and formed with diametrically opposite catch webs; said hammer head having faces adapted to engage behind said catch webs upon rotation of said locking rod, said faces extending circumferentially of said locking rod and obliquely relative to the axis thereof; said locking mechanism being located at the corner of a right triangle situated in the junction plane of said hollow mold and whose other corners are the axes of said two supporting bars, the right angle of said triangle being at the axis of that supporting bar which is the trailing supporting bar considered in the direction of movement of said closure assembly from said blow station toward said plasticating unit.

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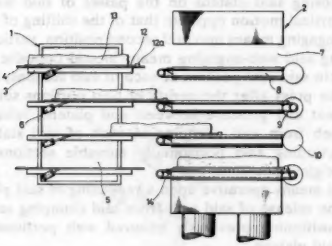
## 3,964,853
## APPARATUS FOR LOADING MULTI-STAGE HEATING PRESSES

**Werner Fledges, and Peter van Hullen, both of Krefeld, Germany, assignors to Becker & van Hullen Niederrheinische Maschinenfabrik, Krefeld, Germany**

**Filed Nov. 13, 1974, Ser. No. 523,312**
**Int. Cl.² B29C *3/00***
**U.S. Cl. 425—338** **5 Claims**



1. Apparatus for charging a multiple-opening hot-moulding press having a plurality of vertically spaced platens, and having an entrance side and an exit side, comprising:

a feed basket located on the entrance side of the press, said feed basket having a plurality of horizontal shelves corresponding in number with the press platens, said shelves being substantially in horizontal register with their respective press platens;

a pallet slidably supported on each of said shelves;

a flexible transport support resting on each of said pallets, said flexible transport serving to carry the material to be pressed;

laterally extending towing strips fixed to the front ends of said flexible transport strips, the ends of said towing strips projecting laterally beyond the side edges of the transport support and beyond the side edges of the press platens;

means on said feed basket for linearly moving each of said pallets with its respective flexible transport support carried thereon toward the corresponding press platen until the pallet abuts against the press platen, and their respective top surfaces form a smoothly faired, continuous surface;

driving means movable alongside said press platen and engageable with the laterally projecting ends of said towing strips to pull said transport support off of said pallet and onto the press platen.

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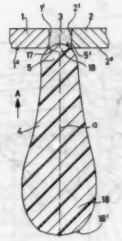
## 3,964,854
## DEVICE FOR FINISHING TILE JOINTS

**Johannes Groeneveld, Varrentrappstrasse 51, D-6 Frankfurt am Main, Germany**

**Filed June 6, 1974, Ser. No. 477,314**
**Claims priority, application Germany, June 8, 1973, 2329312**
**Int. Cl.² B29C *23/00*; B29F *3/012*; E04G *21/20***
**U.S. Cl. 425—458** **18 Claims**



1. A scraping and pressing tool or device for finishing the surface of a jointing material between tegular elements applied to a surface and wherein said elements lie in the same plane, comprising a head, and a support therefor adapted to be gripped by hand for manipulation of the device, the terminal shape of said head being hemispherical in form such that it can be brought into operational engagement with the adjoining edges of adjacent tegular elements defining a joint with limited contact at each said edge and with a continually diminishing transverse dimension from the contact regions to the center portion of said head along said joint.

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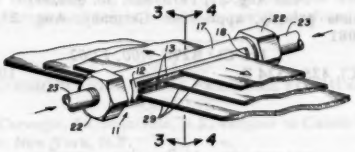
## 3,964,855
## TUBULAR SPINNERETTE ASSEMBLY

**Maurice J. Jones, Decatur, Ala., assignor to Monsanto Company, St. Louis, Mo.**

**Filed Aug. 19, 1974, Ser. No. 498,355**
**Int. Cl.² D01D *3/00***
**U.S. Cl. 425—463** **1 Claim**



1. A spinnerette assembly, comprising

a. a tubular spinning element having therein a plurality of spinning orifices positioned in rectangular arrays extending along the spinning element, said spinning element also having flange means extending along the length thereof,

b. a tubular support member enclosing the spinning element and having therein internal groove means for receiving the flange means on the spinning element to prevent relative movement of said element and said member, said support member also having therein elongated slot means positioned to expose the arrays of spinning orifices in the spinning element,

c. inlet line means positioned to feed a spinning composition axially into the spinnerette assembly,

d. gasket means positioned between the spinning element and the inlet line means, and
e. means for securing the inlet line means to the support member.

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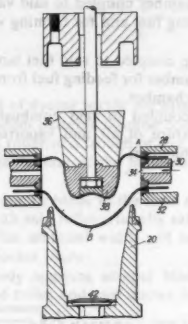
**3,964,856**

## VACUUM MOULDING TECHNIQUES

**Robert H. Day, Bracknell, England, assignor to Illinois Tool Works Inc., Chicago, Ill.**

**Continuation of Ser. No. 424,395, Dec. 13, 1973, abandoned. This application June 16, 1975, Ser. No. 587,509**
**Claims priority, application United Kingdom, Dec. 19, 1972, 58608/72**
**Int. Cl.² B29C *17/04***
**U.S. Cl. 425—503** **1 Claim**



1. Apparatus for molding open-ended containers from two sheets of thermoplastic material, said apparatus comprising three annular clamp plates mounted in a vertically stacked parallel arrangement and movable in parallel in a vertical direction to clamp said sheet material therebetween, means for holding a first roll of one thermoplastic sheet material, a first waste roller, the sheet material from said first roll adapted to extend horizontally between the middle and upper clamp plates of said three clamp plates for feeding said one sheet material from said first roll horizontally between the middle and upper clamp plates of said three clamp plates when said middle and upper clamp plates are vertically separated, means for holding a second roll of a second thermoplastic sheet material, a second waste roller, the sheet material from said second roll adapted to extend horizontally between the middle and lower clamp plates of said three clamp plates for feeding said second sheet material from said second roll horizontally between the middle and lower clamp plates of said three clamp plates when said middle and lower clamp plates are vertically separated, heating means for heating said one and said second sheet material from said first and second rolls, said heating means mounted horizontally between said rolls and said three clamp plates to heat said one and said second sheet material, an open-ended thermoforming die mounted with the open end thereof below and concentrically within said lower clamp plate and movable relative to said three clamp plates in a vertical direction, a thermoforming plunger mounted above and concentrically within said upper clamp plate and vertically movable to engage and force said one and said second sheet material clamped between said three clamp plates downwardly into said thermoforming die, an annular cutoff die mounted above and concentrically about said plunger and selectively movable independently of said plunger through said three clamp plates and into cooperation with the open end of said thermoforming die to selectively clamp and cut off the portions of said one and said second sheet material within said three clamp plates, said middle clamp plate having an air port for selective application of air under pressure between said one and said second sheet material clamped between said three clamp plates, and air port means formed between said cutoff die and said plunger for selective application of air under pressure to the upper side of said one of said one and said second sheet material when said cutoff die cooperates with said open end of said thermoforming die.

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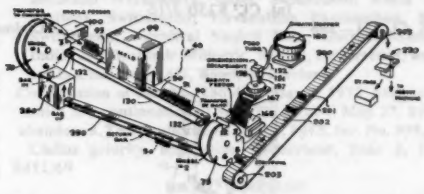
**3,964,857**

## CONTINUOUS AUTOMATED PLASTIC INJECTION MOLDING APPARATUS FOR MAKING SYRINGES HAVING A COVERING SHEATH

**Wilbert Redmer, Boca Raton; Kenneth Rolin, Del Ray Beach, and Herman Nittel, Boca Raton, all of Fla., assignors to Abbott Laboratories, North Chicago, Ill.**

**Division of Ser. No. 241,934, April 7, 1972. This application Dec. 13, 1974, Ser. No. 532,551**
**Int. Cl.² B29D *3/02***
**U.S. Cl. 425—515** **6 Claims**



1. In an apparatus for molding and assembling a syringe barrel having a needle hub with a needle molded therein and a sheath inserted on the hub to cover and protect the needle, said apparatus including a molding machine having mold sections for receiving a mold core, said apparatus comprising:
- a carrier having a mold core shaped to conform to the syringe barrel extending therefrom for presenting the mold core to said molding machine;
- a first rotatable, indexable trunnion transfer wheel positioned on one side of said molding machine and having a plurality of carrier receiving cradles on the periphery thereof, said first transfer wheel receiving and transferring said carrier to various positions around the periphery thereof;
- a needle feeding station positioned adjacent said first trunnion transfer wheel, said station including needle feeding means for positioning a needle in the core extending from the carrier, said transfer wheel being indexable to said needle feeding station;
- a second rotatable, indexable trunnion transfer wheel on the other side of said molding machine opposite said first trunnion transfer wheel and having a plurality of carrier receiving cradles on the periphery thereof, said second transfer wheel receiving and transferring said carrier with a molded syringe barrel thereon;
- a sheath feeding and loading station positioned adjacent said second trunnion transfer wheel, said station including sheath feeding and loading means for inserting a sheath on the needle hub on the syringe barrel;
- an unloading station positioned adjacent said second trunnion transfer wheel following said sheath feeding and loading station, said unloading station including unloading means for removing and releasing the molded syringe barrel from the core on the carrier, said second transfer wheel being indexable to said sheath feeding and loading and unloading stations;
- means for indexing said trunnion transfer wheels;
- conveyor means connecting said first trunnion transfer wheel, molding machine and second trunnion transfer wheel for transporting the carrier from the first transfer wheel to the mold in the molding machine to the second transfer wheel;

driving means for moving said conveyor means to advance the carrier to and away from said molding machine from the first trunnion transfer wheel to the second trunnion transfer wheel;

means for ejecting the carrier from the first trunnion transfer wheel onto the conveyor means;

return means connecting the second trunnion transfer wheel and the first trunnion transfer wheel for transferring the carrier from the second trunnion transfer wheel back to the first trunnion transfer wheel after the molded and assembled syringe barrel has been removed from the core on the carrier; and

means for ejecting the carrier from the second trunnion transfer wheel onto the return means.

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**3,964,858**

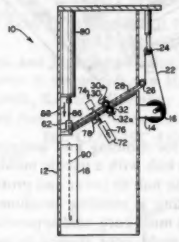
## AUTOMATIC CANDLE-WICKING MACHINE

**Norman J. Marik, Sibley Drive, Selmer, Tenn. 38375**

**Filed Sept. 30, 1974, Ser. No. 510,157**

**Int. Cl.² F23D *3/16***

**U.S. Cl. 431—288** **7 Claims**



1. Apparatus to effect wicking of candles which comprises,

a roll of candle wick,

means to measure and cut off a length of wick,

a candle, and

an integral fixed wicking tube supported above the candle having one opening to receive the candle wick, and a second opening at an angle to the one opening, a wicking rod adapted to be received into the second opening, said second opening having an extended length to receive the wicking rod in close fitting sliding relation to serve to support and guide the wicking rod, and means to move the wicking rod to engage near the end of the candle wick and drive it into the candle on the central axis thereof to substantially the full length of the candle.

**3,964,859**

## VAPORIZING TYPE LIQUID FUEL COMBUSTION APPARATUS

**Atsuyoshi Nishi; Isamu Kawabuchi; Katuo Yashiro, all of Nakatsugawa; Kenichi Ono, and Yoshiaki Furuya, both of Kamakura, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 10, 1975, Ser. No. 557,094**

**Claims priority, application Japan, Mar. 11, 1974, 49-29101[U]; Mar. 11, 1974, 49-29100[U]; Mar. 11, 1974, 49-28737; Mar. 11, 1974, 49-29102[U]**

**Int. Cl.² F23H *1/00***

**U.S. Cl. 431—78** **4 Claims**

1. A vaporizing type liquid fuel combustion apparatus comprising:

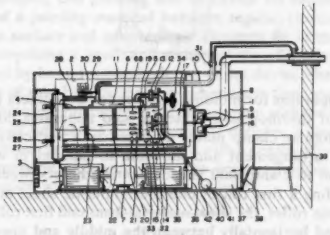
a vaporization chamber for vaporizing a liquid fuel,

a combustion chamber coupled to said vaporization chamber for receiving fuel and for forming vaporized fuel,

a fuel tank,

an electric pump coupled to said fuel tank and to said vaporization chamber for feeding fuel from said tank to said vaporization chamber,

blower means coupled to said combustion chamber for feeding a mixture of air and vaporized fuel into said combustion chamber,



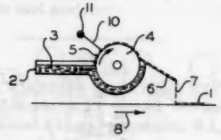
pump control means coupled to said electric pump for intermittently driving said pump in response to flame temperature in said combustion chamber,

said pump control means including a control element for supplying an AC voltage so that the average feed rate of said pump is between 0.3 and 0.08 cc/second.

## 3,964,860
## METHOD FOR DYEING CARPETS AND THE LIKE

**Ferdinand Leifeld, Kempen, Germany, assignor to Eduard Kusters, Krefeld, Germany**

**Filed Jan. 31, 1974, Ser. No. 438,333**
**Claims priority, application Germany, Dec. 11, 1973, 2361517**
**Int. Cl.² D06B *11/00***
**U.S. Cl. 8—151** **10 Claims**




1. A method of dyeing textile materials such as a carpet so as to form random patterns thereon comprising the steps of:
   a. rotating a roller in a trough of dye to form a dye film of width equal to that of the material for deposit onto the material;
   b. placing a doctor blade in the form of an inclined plate in contact with said roller whereby said dye film of a width equal to the material width will be transferred to said inclined doctor blade;
   c. continuously applying scraper blades to the surface of one of said roller and said doctor blade to alter the film thereon;
   d. continuously varying the transverse position of said scraper blades with respect to time so as to form continuous strips varying amounts of dye which vary across the material width with respect to time; and
   e. depositing the strips so formed on the textile material by permitting said strips to flow off said inclined plate and fall on material moving therebelow.

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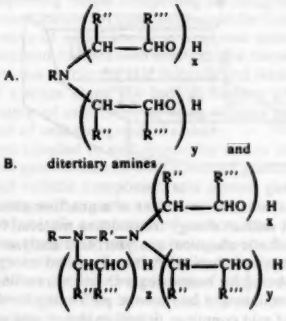
## 3,964,861
## ALKOXYLATED ALIPHATIC AMINES TO INHIBIT OZONE FADING OF DYED POLYAMIDES

**Robert Alden Lofquist, and Peter Reginald Saunders, both of Richmond, Va., assignors to Allied Chemical Corporation, Petersburg, Va.**

**Continuation-in-part of Ser. No. 211,695, Dec. 23, 1971. This application Jan. 28, 1974, Ser. No. 437,255**
**Int. Cl.² D06P *1/36***
**U.S. Cl. 8—165** **6 Claims**

1. In a method for dyeing polycarbonamide fibers with anthraquinone dyes, the improvement comprising coating the fiber with a substance consisting essentially of a compound selected from the group consisting of tertiary amines




where R is an alkyl radical having 8 to 25 carbon atoms, R' is an alkylene radical having 2 to 10 carbon atoms, R'' and R''' are independently selected from hydrogen, a phenyl or an alkyl radical of 1 to 3 carbon atoms, provided that R'' and R''' cannot both be hydrogen, $x$, $y$ and $z$ are each whole numbers, and in compound A $(x+y)$ is not greater than 6, and in compound B $(x+y+z)$ is not greater than 9, so that an amount of from about 0.4 to about 5 percent on weight of fiber remains on said fiber after dyeing to be exposed to ozone, whereby the dyed polycarbonamide fiber has improved fastness of dye when exposed to ozone.

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## 3,964,862
## PROCESS FOR DYEING AND PRINTING TEXTILE MATERIALS OF SYNTHETIC ORGANIC FIBERS

**Purushottam Janardan Kangle, Goregaon-Bombay, India; Hermann Werdenberg, Basel, Switzerland; Klaus Artz, Muttenz, Switzerland; Visvanathan Ramanathan, Basel, Switzerland; Navnitrai Nagirji Naik, Goregaon-Bombay, India, and Branimir Milicevic, Riehen, Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland**

**Continuation of Ser. No. 250,494, May 5, 1972, abandoned, which is a continuation of Ser. No. 41,094, May 27, 1970, abandoned. This application Sept. 21, 1973, Ser. No. 399,659**
**Claims priority, application Switzerland, June 3, 1969, 8411/69**
**Int. Cl.² D06P *3/00***
**U.S. Cl. 8—176** **12 Claims**

1. A process for dyeing and printing textile material made of or containing fully synthetic hydrophobic linear polymers which are free from amino groups, comprising the steps of
   1. padding the material with a dispersion dyestuff containing at least one carboxyl group and no sulfonic acid groups,
   2. drying the padded textile material,
   3. printing the dried textile material with a printing paste which contains heat-resistant alkaline compound as the only chemically reactive component, whereby the carboxyl-group-containing dyestuff forms a salt with the alkaline compound,
   4. heating the textile material to fix the unreacted dyestuff thereon, and
   5. washing the textile material to remove the dyestuff salt from the printed areas.

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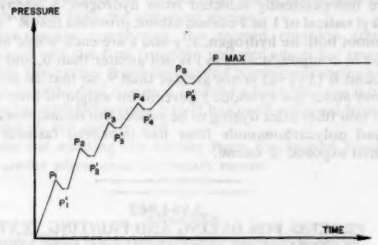
## 3,964,863
## METHOD FOR IMPREGNATING WOOD

**Guy Crockett Carr, 11635 SW. Canyon Road, Beaverton, Oreg. 97005**

**Continuation of Ser. No. 384,552, Aug. 1, 1973, abandoned, which is a continuation of Ser. No. 172,767, Aug. 18, 1971, abandoned. This application Sept. 9, 1974, Ser. No. 504,592**
**Int. Cl.² B27K *3/08, 7/00, 9/00***
**U.S. Cl. 21—7** **6 Claims**

1. A method of impregnating members having a fibrous, capillary, cellular construction capable of fluid impregnation with a penetrating fluid comprising the steps of:
   a. placing the members to be impregnated within a pressure chamber;
   b. sealing said pressure chamber;
   c. supplying said sealed pressure chamber with said penetrating fluid until said pressure chamber is filled therewith and until a first predetermined pressure level is reached within said pressure chamber;
   d. discontinuing the supply of said penetrating fluid into said sealed pressure chamber without venting the chamber for a time sufficient to permit the pressure level in said sealed pressure chamber to decrease to a first stabilized pressure level below said first predetermined pressure level due to

the pressure of said penetrating fluid attaining equilibrium with the frictional and other forces in the cells of said member;




e. repeating steps (c) and (d) so that said penetrating fluid is intermittently pumped into said sealed pressure chamber to successively increased pressure levels until a maximum pressure level is reached.

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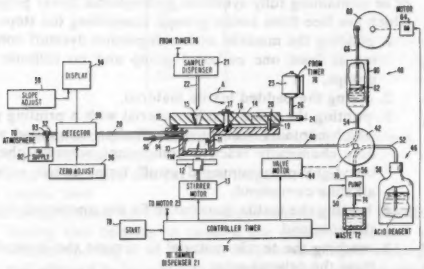
**3,964,864**

## METHOD AND APPARATUS FOR MEASURING $CO_2$, $O_2$, AND Cl IN BODY FLUIDS

**Harald Dahms, 22 Lakeview Road, Ossining, N.Y. 10562**

**Filed Nov. 18, 1974, Ser. No. 524,793**
**Int. Cl.² G01N *33/16, 27/18***
**U.S. Cl. 23—230 B** **47 Claims**




47. A method for detection of a species in a sample of fluid, comprising the steps of:

placing said sample and a reagent in a vessel having a gas space with a given gas mixture therein to react said sample and said reagent to alter the composition of said given gas mixture,

transferring at least a portion of said altered gas mixture to a detector by adding a displacing liquid to said vessel,

measuring a stationary sample of said altered gas mixture in said detector,

draining said sample and reagent from said vessel, and

flushing said detector and said vessel with a flushing fluid.

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**3,964,865**

## LYOPHILIZED HUMAN HEMOGLOBIN STANDARD FOR COLORIMETRIC DETERMINATION OF TOTAL HEMOGLOBIN

**Manik L. Das, Crestwood, Mo., assignor to Sigma Chemical Company, St. Louis, Mo.**

**Filed Jan. 30, 1975, Ser. No. 545,298**
**Int. Cl.² G01N *21/20, 33/16***
**U.S. Cl. 23—230 B** **11 Claims**

5. In a method of colorimetrically determining total hemoglobin in a sample solution wherein the hemoglobin is converted in solution to a methemoglobin derivative and the color of the resultant solution is compared with the color produced by a standard solution of the same methemoglobin derivative, the improvement wherein said standard solution is prepared from a known quantity of lyophilized methemoglobin.

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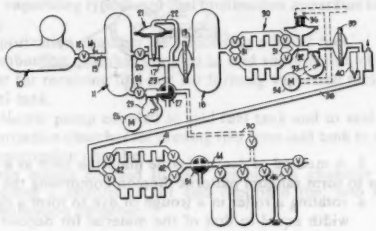
**3,964,866**

## HELIUM RECLAMATION

**William Barney Shelby, 5 Rockbourne St., Elizabeth South, Australia (5112)**

**Filed Sept. 13, 1974, Ser. No. 505,551**
**Int. Cl.² B01J *1/22*; B01D *53/14*; C01B *23/00***
**U.S. Cl. 23—252 R** **6 Claims**



1. An apparatus for reclaiming helium from an admixture of gas provided to a diving means having a diving bell with a discharge valve comprising

a bell conduit having coupling means for connection to the discharge valve;

a first means coupled to the bell conduit for receiving the gas passed therethrough;

a second means coupled to the first receiver by an interconnecting conduit for receiving the gas passed therethrough;

a regulating valve means in the inteconnecting conduit for closing upon increase of pressure of the gas in the second receiver means;

compressor means coupled downstream of and to the second receiver means for increasing the gas pressure to a storage pressure;

storage means coupled downstream of and to the compressor means for receiving the pressurized gas and

means for removing contaminants in the discharged gas between the diving bell and the storage means.

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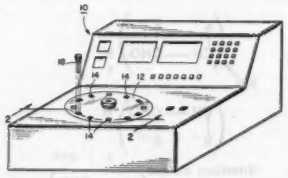
**3,964,867**

## REACTION CONTAINER

**John Franklin Berry, Houston, Tex., assignor to Hycel, Inc., Houston, Tex.**

**Filed Feb. 25, 1975, Ser. No. 553,008**
**Int. Cl.² G01N *33/16, 21/24*; B65D *79/02***
**U.S. Cl. 23—253 R** **14 Claims**



1. A singular reaction container of a nonflorescent, visible and ultraviolet radiant energy transmitting material for insertion in an automatic chemical analyzer, said analyzer causing energy to be applied through first and second energy paths, said first path being for measuring a chemical reaction occurring in said container and said second path being for detecting the insertion of said container in said analyzer, said container

intersecting said first energy path when inserted in said analyzer, said container comprising four sides, two of which are parallel and a fixed distance apart, at least one of said sides having an extension therefrom to correspond to an indention in said analyzer, said extension being placed to position said two parallel sides to intersect said energy path when said container is inserted in said analyzer with said extension inserted in said indention, at least one of said two parallel sides includes a nontransparent area remote from the portion of that side which intersects said energy path, and positioned on that side to intersect only said second path when said container is inserted in said analyzer.

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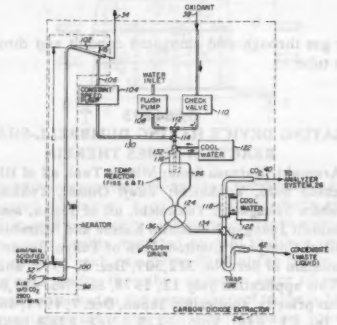
## 3,964,868
## ORGANIC CARBON ANALYZER SYSTEM

**Louis S. DiCola, Lincoln, R.I.; Donald W. Kemp, Marion, Mass., and H. Duane Evans, Portsmouth, R.I., assignors to Raytheon Company, Lexington, Mass.**

**Filed May 24, 1974, Ser. No. 473,116**
**Int. Cl.² G01N 31/12**
**U.S. Cl. 23—253 PC** **18 Claims**



1. An organic carbon analyzer system for analyzing material such as that found in raw sewage containing inorganic and organic carbonaceous substances, said system comprising:

means for treating said material with a chemical reagent that reacts with inorganic carbonaceous substances to produce a volatile compound of carbon;

means coupled to said treating means for dispersing said material in a first gaseous carrier, said first gaseous carrier being an absorber of said volatile compound, said dispersing means comprising an elongated chamber and means located at one end thereof for forcing a gas past a source of said material to urge said material to flow in a common current with said gas and thereby serve as said gaseous carrier for said material and inhibit the formation of a scum along the interior surface of said tube, said source of said material being located adjacent said one end of said elongated chamber;

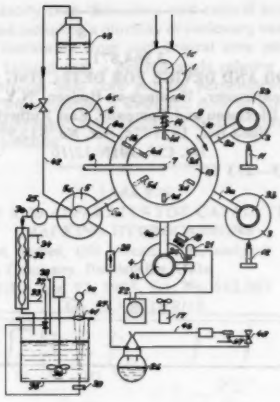
means coupled to said dispersing means for replacing said first gaseous carrier with a second gaseous carrier free of said volatile compound, said second gaseous carrier reacting with organic carbonaceous substances to produce said volatile compound of carbon; and

means coupled to said replacing means for measuring the concentration of said volatile compound in said second gaseous carrier, the amount of said concentration being a measure of the amount of organic carbonaceous substances in said material.

## 3,964,869
## ANALYTICAL APPARATUS FOR SERIAL DETERMINATION OF NITROGEN IN SAMPLES BY THE KJELDAHL METHOD

**Poul Erik Aegidius, Helsinge, Denmark, assignor to N.K. Verwaltungs AG, Zug, Switzerland**

**Continuation of Ser. No. 447,179, Feb. 28, 1974, abandoned. This application July 11, 1975, Ser. No. 594,937**
**Claims priority, application Denmark, Mar. 1, 1973, 1119/73**
**Int. Cl.² G01N 31/16, 33/00**
**U.S. Cl. 23—253 R** **7 Claims**



1. An analytical apparatus for serial determination of nitrogen in samples by the Kjeldahl method, comprising:

a. a roundabout;

b. a plurality of flasks suspended vertically by the roundabout, each flask being provided with a cover and a side tube;

c. means for removing decomposition products;

d. drive means connected to rotate the roundabout stepwise to bring each flask in succession to a first position and advance each flask from the first position into several intermediate positions in succession and bring it back to the first position;

e. means for introducing sample material and decomposition material into the flask in the first position;

f. means for heating the flask in at least one subsequent intermediate position;

g. means for cooling the flask in a following position;

h. means for feeding diluent water into the flask in said following position;

i. means for introducing neutralizing material and steam into the flask in a further following position;

j. means for titrating the distillate from the flask in the said further following position;

k. means for emptying the flasks in the last said intermediate positions;

l. means for removing the covers on the completion of decomposition.

3,964,870

## DIAGNOSTIC COMPOSITION FOR THE DETERMINATION OF GLUCOSE

Hugo Tiedemann, Mannheim-Wallstadt; Bernward Sojka, Viernheim; Hans Lange, Lampertheim; Hans-Georg Rey, and Peter Rieckmann, both of Mannheim-Waldhof, all of Germany, assignors to Boehringer Mannheim G.m.b.H., Mannheim-Waldhof, Germany

Filed Mar. 4, 1975, Ser. No. 555,327

Claims priority, application Germany, Mar. 29, 1974, 2415257

Int. Cl.[2] G01N *31/14, 31/22, 33/16*

U.S. Cl. 23—253 TP 10 Claims

1. Diagnostic agent for the detection of glucose in urine, comprising an absorbent carrier impregnated with glucose oxidase, peroxidase, an indicator compound and, as a buffer, 2-(N-morpholino)-ethane-sulfonic acid.

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3,964,871

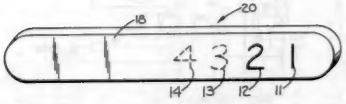
## METHOD AND DEVICE FOR DETECTING GLUCOSE

Harry Hochstrasser, Hastings-on-Hudson, N.Y., assignor to Becton, Dickinson and Company, East Rutherford, N.J.

Filed Dec. 18, 1974, Ser. No. 533,972

Int. Cl.[2] G01N *33/16*

U.S. Cl. 23—253 TP 21 Claims




1. An indicator for the measurement of glucose dissolved in biological fluids, which comprises:

a support member; and

a plurality of indicating reagents for glucose, each of which is located in a separate zone of said member and at least two of which indicate the presence of different concentrations of glucose in solution.

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3,964,872

## INJECTING DEVICE OF A SOLVENT-FREE SAMPLE FOR A GAS ANALYZER

Hannu Henrik Karinkanta, Linnunpaantie 50, 20840 Turku 84, Finland

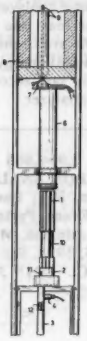
Filed Dec. 27, 1974, Ser. No. 536,888

Claims priority, application Finland, Dec. 29, 1973, 2117/73

Int. Cl.[2] G01N *31/06, 31/08;* B01D *15/08*

U.S. Cl. 23—259 7 Claims

1. A sample injecting device for a gas analyzer, comprising a vessel, a cassette within said vessel, a plurality of straight elongated sample tubes open at both ends disposed in said cassette in parallel relation to each other, a furnace with which said vessel communicates, and means for conveying said sample tubes one by one lengthwise from said cassette into said furnace and for returning said sample tubes from said furnace to said cassette, said conveying means comprising an elongated conduit paralle to said sample tubes and selectively engageable with one of said open ends of a said sample tube, means for moving said elongated conduit lengthwise to introduce said sample tube into said furnace and to withdraw said sample tube from said furnace, and means to introduce a



carrier gas through said elongated conduit and through said sample tube.

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3,964,873

## HEATING DEVICE HAVING DUMBBELL-SHAPED REACTION TUBES THEREIN

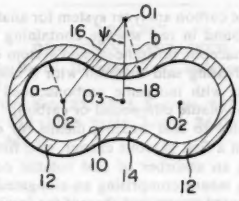
Seigo Aramaki; Katsuzo Sudo; Mitsuo Tani, all of Hiroshima; Takehiko Sato, Yokkaichi; Yuuji Onishi, Yokkaichi, and Nobuhiro Sakaguchi, Yokkaichi, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha and Mitsubishi Petrochemical Company Limited, both of Tokyo, Japan

Continuation of Ser. No. 312,309, Dec. 5, 1972, abandoned. This application July 12, 1974, Ser. No. 487,883

Claims priority, application Japan, Dec. 7, 1971, 46-98779

Int. Cl.[2] F16L *9/06;* F22B *37/12;* F28D *15/00*

U.S. Cl. 23—277 R 1 Claim




1. In a furnace for the thermal decomposition of hydrocarbons comprising a chamber having heating means positioned at opposite locations therein, and at least one elongate reaction tube spaced between said heating means; the improvement which comprises said reaction tube having a cross sectional dumbbell-shape and having in cross section perpendicular to the longitudinal axis of said tube a major and minor diameter of the following interrelated characteristics:

$$0° < \Psi < 60°$$

$$10 \text{ mm} < a < 60 \text{ mm}$$

$$5 \text{ mm} < b < 2000 \text{ mm}$$

where

$a$ = the radius of curvature of the inside surface of the reaction tube at the circular portions of said dumbbell-shape,

$b$ = radius of curvature of the inside surface of the reaction tube at the narrow portion of said dumbbell-shape and,

$\Psi$ = the angle between a line connecting the center of curvature at the narrow portion and the center of curvature at the circular portion and a line extending from said center of curvature at the narrow portion through the center of the narrow part

and wherein the major diameter of the dumbbell-shaped reaction tube is parallel to each of said heating means.

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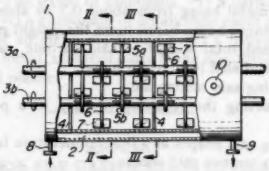
**3,964,874**

## CONTINUOUS REACTOR FOR VISCOUS MATERIALS

**Morihisa Maruko; Chikao Oda, and Eizi Nakashima, all of Kudamatsu, Japan, assignors to Hitachi, Ltd., Japan**

**Filed Mar. 30, 1973, Ser. No. 346,309**
**Claims priority, application Japan, Apr. 12, 1972, 47-36057**
**Int. Cl.² B01J** *10/00;* **B01F** *7/02*
**U.S. Cl. 23—285** **11 Claims**



1. A continuous reactor comprising a substantially horizontal elongated container; a pair of parallel shafts rotatably mounted in said container; a plurality of figure-eight-shaped agitation rotors fixedly mounted on said shafts in pairs, one agitation rotor of each pair being fixed at the center thereof to one of said shafts, the other agitation rotor of each pair being fixedly attached at the center thereof to the other shaft, said one agitation rotor and said other agitation rotor being coplaner and normal to said shafts and arranged at a phase angle of 90° with respect to each other; and a plurality of scraper plates mounted in pairs to the ends of said agitation rotors remote from the centers thereof, said scraper plates being held at right angles to said agitation rotors and in parallel with said shafts, said shafts being spaced apart so as to allow the scraper plates attached to the agitation rotors on each shaft to pass in close proximity to the other shaft as said shafts rotate.

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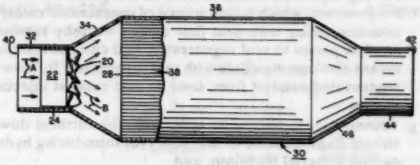
**3,964,875**

## SWIRL EXHAUST GAS FLOW DISTRIBUTION FOR CATALYTIC CONVERSION

**Zung S. Chang, Painted Post; John S. Howitt, Big Flats, and Robert V. VanDewoestine, Corning, all of N.Y., assignors to Corning Glass Works, Corning, N.Y.**

**Filed Dec. 9, 1974, Ser. No. 530,658**
**Int. Cl.² B01J** *8/02, 35/04;* **F01N** *3/15;* **F15D** *1/00*
**U.S. Cl. 23—288 FC** **4 Claims**

1. In an exhaust system including an exhaust pipe of one diameter, a housing of a larger diameter containing a catalyst substrate, and a frustoconical diffuser member having an entrance opening adjacent said exhaust pipe and an exit opening adjacent said housing, said diffuser member connecting said exhaust pipe and said housing together wherein said exhaust pipe, diffuser and housing are axially aligned along and disposed about a common central axis, the improvement comprising deflector means positioned across the entrance opening of said diffuser for distributing the flow of exhaust gases emanating from said exhaust pipe into said housing, said deflector means including a central core portion positioned substantially coaxial with said central axis extending through said exhaust pipe, diffuser, and housing; means extending from said core portion for deflecting exhaust gases entering said diffuser angularly away from said central axis and for forming a velocity profile within said housing such that an annular area concentrically remote from said central axis has



a greater velocity than that along said central axis; said deflecting means including a plurality of stationary vanes extending radially outwardly from said central core portion; said vanes being twisted with a desired angle relative to a plane extending through said core portion perpendicular to said central axis for imparting a swirl-like flow to exhaust gases passing therethrough; and means for fixably mounting said deflector in position.

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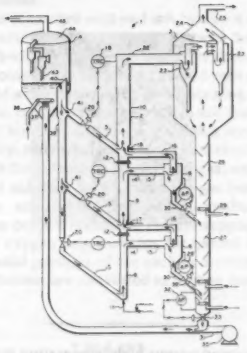
**3,964,876**

## METHOD AND APPARATUS FOR CATALYTICALLY CRACKING HYDROCARBONS

**John Preston James, Old Ocean, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Jan. 17, 1975, Ser. No. 542,007**
**Int. Cl.² B01J** *8/18*
**U.S. Cl. 23—288 S** **2 Claims**



1. An apparatus for catalytically cracking hydrocarbons comprising:

a. an elongate reactor having a chamber therein adapted for flow of fluid and catalyst therethrough, said chamber having an inlet and an outlet and being divided into a plurality of zones;

b. a plurality of catalyst injection means each connected to a source of regenerated catalyst and communicating with said reactor chamber at spaced apart positions along the length thereof for injecting catalyst into each of said zones;

c. a plurality of conduits each communicating between respective adjacent zones and forming flow paths therebetween;

d. a plurality of cyclone separators each operatively associated with a respective said conduit to effect removal of catalyst from fluid flowing through said conduits and at least one cyclone separator communicating with said outlet to effect removal of catalyst from fluid discharged from said outlet;

e. first means communicating with said separators for receiving separated catalysts from said separators;

f. a regeneraor, which is said source of regenerated catalyst, communicating with said first means whereby removed catalyst passes to said regenerator, said catalyst injection means also communicate with said regenerator for flow of regenerated catalyst from same to said catalyst injection means;

g. second means communicating with the furthest downstream disposed zone of said zones for introducing hydrocarbon material thereinto; and

h. temperature responsive control means operatively associated with each said zone and respective said catalyst injection means to control the introduction of catalyst in response to the temperature in the respective zone.

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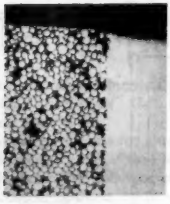
**3,964,877**

## POROUS HIGH TEMPERATURE SEAL ABRADABLE MEMBER

**Irwin I. Bessen; Robert K. Betts, both of Cincinnati, and Robert V. Hillery, West Chester, all of Ohio, assignors to General Electric Company, Cincinnati, Ohio**

**Filed Aug. 22, 1975, Ser. No. 606,956**
**Int. Cl.² C22C *1/04***
**U.S. Cl. 29—182** **5 Claims**



1. An improved porous high temperature member having an improved combination of oxidation and erosion resistance, controlled thermal conductivity and low elevated flow stress which provides, upon rubbing contact with another member, a compliant base and a flowed, substantially continuous facing, the member comprising:

a plurality of metallurgically bonded, metallographically distinguishable metal alloy powder particles substantially in the size range of about +140 to about −270 ASTM (U.S. Standard Sieve);

the alloy of the metal particles consisting essentially of, by weight, 15–35% Cr, 8–20% Al, up to 5% of one or more elements selected from the group consisting of Y, Hf and the rare earth elements, with the balance selected from the group consisting of Fe, Co and Ni and incidental impurities;

the member having density in the range of about 65–90% of theoretical density established by the inclusion of pores.

**3,964,878**

## CEMENTED CARBIDE EMPLOYING A REFRACTORY METAL BINDER AND PROCESS FOR PRODUCING SAME

**William Scheithauer, Jr., Athens, and Glenn Albert Shaffer, Towanda, both of Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.**

**Filed June 6, 1973, Ser. No. 367,433**
**Int. Cl.² C22C *1/06*; B22F *3/16*; C22C *29/00***
**U.S. Cl. 29—182.7** **9 Claims**

1. A cemented carbide composition consisting essentially of from about 15 to about 50 percent by weight of a refractory metal carbide selected from carbides of refractory metals of the Group 4, Group 5, and Group 6 metals and mixtures thereof, from about 50 to about 85 percent of a binder selected from said refractory metals and from about 0.5 to about 1.5% of an iron group metal selected from iron, nickel and cobalt.

6. A process for producing a cemented carbide composition comprising:

a. forming an admixture by suitable mixing of refractory metal carbide, a refractory metal, a wax, an iron group metal, and a volatile mixing aid; said refractory metal carbide being from about 15 to about 50%, said refractory metal being from about 50 to 85% and said iron group metal being from about 0.5 to about 1.5%, said percentages being based upon the weight percent of the combined total weight of said carbide, said refractory metal and said iron group metal;

b. removing said mixing aid;

c. compacting the resulting powder to a predetermined shape;

d. heating said shapes at a first temperature for a sufficient time to remove said wax;

e. heating said shapes at a second temperature above the melting point of said iron group metal for at least about two hours; and thereafter

f. heating said shapes at a sintering temperature from about 1850°C to about 1950°C for a time sufficient to achieve complete sintering of the resulting particles.

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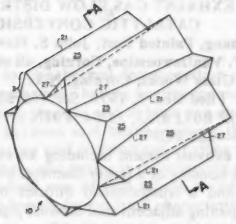
**3,964,879**

## FASTENER FOR JOINING ARTICLES

**James F. Asmus, Rte. 1, Box 46A, East Liberty, Ohio 43319**

**Continuation-in-part of Ser. No. 224,569, Feb. 8, 1972, abandoned. This application May 21, 1974, Ser. No. 472,052**
**Int. Cl.² F16B *39/30***
**U.S. Cl. 29—183.5** **5 Claims**



1. A fastener having an elongated portion for insertion into a cavity, said elongated portion including: a plurality of ridges

parallel to one another and parallel to the longitudinal axis of said elongated portion; said ridges defining a groove between each of said ridges; said grooves having, along the longitudinal axis of said elongated portion, substantially constant cross-sectional area and a substantial sequential change in cross-sectional shape; and means on the ends of said ridges for deflecting material defining said cavity into said grooves.

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## 3,964,880
## FUEL PASTE AND PROCESS FOR ITS PRODUCTION

**Walter Siegrist, Visp (Kanton Wallis), Switzerland, assignor to Lonza Ltd., Gampel, Switzerland**

**Filed Oct. 17, 1974, Ser. No. 515,602**

**Claims priority, application Switzerland, July 16, 1974, 9763/74**

**Int. Cl.² C10L *7/00***

**U.S. Cl. 44—7 B** **13 Claims**

1. A fuel paste which comprises (a) ethanol, (b) an ethanol-soluble thickening agent and (c) an inorganic fuel carrier mixture of silicon dioxide and at least one member selected from the group consisting of (i) an oxide of silicon, other than silicon dioxide, (ii) an oxide of titanium, (iii) an oxide of zirconium, (iv) an oxide of aluminum, (v) a carbonate of an alkali metal, (vi) a carbonate of an alkaline earth metal, (vii) a hydroxide of an alkali metal and (viii) a hydroxide of an alkaline earth metal, said fuel paste being non-thixotropic and being soft and plastic.

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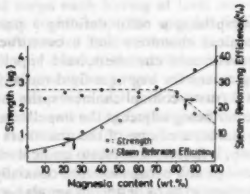
## 3,964,881
## PROCESS FOR GASIFICATION OF HEAVY HYDROCARBONS

**Takeshi Kubota, Kyoto, Japan, assignor to Mitsui Shipbuilding and Engineering Co., Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 459,964, April 11, 1974, abandoned. This application May 2, 1975, Ser. No. 573,871**

**Int. Cl.² C01B *2/16*; C10G *11/28***

**U.S. Cl. 48—214 A** **1 Claim**




1. A continuous process for the catalytic steam decomposition of a residual oil, derived from the atmospheric or reduced pressure ditillation of oil, to completely gasify said residual oil to produce an olefin-containing gas which comprises:

gasifying and decomposing said residual oil with steam at a temperature in the range from about 700° to about 1000°C. in the presence of a catalyst obtained by mixing, kneading and firing a composition consisting essentially of calcium oxide containing about 5 to about 20% ferric oxide, about 10 to about 30% silica, and at least one other oxide selected from the group consisting of magnesia, alumina, and chromium oxide, the amounts of said oxide being about 20 to about 80%, about 1 to about 8%, and about 1 to about 20%, respectively for said oxides, all of said percentages being by weight based on said calcium oxide.

## 3,964,882
## PARTIAL COMBUSTION PROCESS

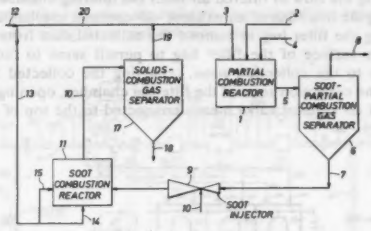
**Gernot Staudinger, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.**

**Filed Oct. 9, 1974, Ser. No. 513,207**

**Claims priority, application Netherlands, Oct. 19, 1973, 7314390**

**Int. Cl.² C10G *13/30*; C10J *3/16*, *3/46*; C10K *1/00***

**U.S. Cl. 48—215** **3 Claims**




1. A process for the production of a substantially soot-free, ash-free gaseous partial combustion product which comprises:

1. partially combusting a hydrocarbonaceous fuel containing ash-forming components in a substantially void combustion zone by reaction between said fuel and an oxygen-containing gas to yield a crude gas product containing principally hydrogen, carbon monoxide, ash and between 5 and 15% soot;
2. passing the crude gas product into a gas-solids separation zone wherein the solid soot particles and ash are separated by centrifugation and gravitation thereby affording a substantially soot-free partial combustion gas product and a solids consisting substantially of separated soot and ash components;
3. passing said separated soot and ash to a soot combustion zone and burning said separated soot with between twofold and a fivefold excess of oxygen over that required for complete combustion of the soot in said soot combustion zone to yield a hot combustion gas containing as principal components, oxygen, carbon dioxide, ash and water;
4. passing said hot combustion gas through a second gas-solids separation zone whereby the ash contained in said gas is separated from the hot combustion gas; and
5. passing the ash-free hot combustion gas from the soot combustion zone into the partial combustion zone whereby the oxygen contained therein supplies at least a part of the oxygen requirements for partial combustion and substantial portions of the carbon dioxide and water contained therein are converted to carbon monoxide and hydrogen.

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## 3,964,883
## METHOD FOR FILTERING AND CLEANING A FILTER BAG

**Yosinori Nakao, Nishinomiya, Japan, assignor to Nakao Filter Media Corporation, Nishinomiya, Japan**

**Filed June 11, 1973, Ser. No. 368,945**

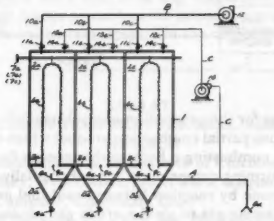
**Claims priority, application Japan, Jan. 13, 1973, 48-6847**

**Int. Cl.² B01D *45/18***

**U.S. Cl. 55—96** **3 Claims**

1. A method of cleaning an air filter unit having at least one filtering chamber, at least one cylindrical filter bag vertically suspended within said chamber in an upright position with the open end of the filter bag facing down, air inlet means extending into the bottom of the filtering chamber and associated with the open end of said vertically suspended filter bag for passing dust laden air upwardly thereinto, first filtered air exhaust valve means connected to the top of said filtering chamber, second air exhaust valve means connected at one

end to the top of said filtering chamber and at the other end to blower means connected to the air inlet means, and at least one dust collection zone positioned at the bottom of the filtering zone below the open end of the filter bag and comprising the following steps: passing dust laden air upwardly into the open end g the filter bag from the air inlet means of the filter chamber, passing the air filtered by the filter bag through the open first filtered air exhaust valve means, while the second air exhaust valve means are closed, stopping the flow of dust laden air into the air inlet means of the filtering chamber, stopping the flow of filtered air from the filtering chamber by closing the first filtered air exhaust valve means, mechanically shaking the filter bag to remove the collected dust from the interior surface of the filter bag to permit same to fall by gravity to the collection zone, removing the collected dust from the collection zone of the filtering chamber, opening the second air exhaust valve means connected to the top of said



filter chamber, operating the blower means to withdraw air from within the filtering chamber and air that has previously passed through the filter bag through the second air exhaust valve means, passing the collected air to said blower means, blowing and circulating such collected and withdrawn air in the closed system into the air inlet means associated with the bottom open end of the filter bag to pass such clean air therethrough and to further clean the inside surface of the filter bag, continuing the passage of the collected and withdrawn air in a closed system for a predetermined time and until the filter bag has been cleaned to the extent desired thereby preventing dust from being discharged into the atmosphere along with the cleaned and filtered air after the initial cleaning and removal of collected dust has been completed, closing the second air exhaust valve means, opening the first filtered air valve exhaust means, and thereafter resuming the passage of the dust laden air into the air inlet means of the filtering chamber for filtering therein.

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**3,964,884**

## MEANS AND METHOD FOR SEPARATION OF WATER FROM STEAM-WATER MIXTURE

**Hans Judith, and Otto A. von Schwerdtner, both of Mulheim (Ruhr), Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany**

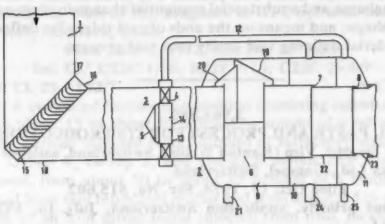
**Filed Oct. 22, 1974, Ser. No. 516,901**

**Claims priority, application Germany, Oct. 23, 1973, 2353111**

**Int. Cl.² B01D** *19/00*

**U.S. Cl. 55—184** **1 Claim**

1. In combination, a high-pressure turbine stage, a low-pressure turbine stage, a duct having an inlet opening connected to said high-pressure turbine stage and an outlet opening connected to said low-pressure turbine stage, means for separating water from a steam-water mixture in said connecting duct, said means comprising a spin generator directly built into said connecting duct, said connecting duct being formed with at least one additional outlet opening downstream of said spin genertor in flow direction of said steam-water mixture for water centrifugally separated by said spin generator from said steam-water mixture, at least one water-receiving chamber surrounding said connecting duct in communication with said additional outlet opening, and a steam suction line connected



at one end thereof to said water-receiving chamber and at another end thereof to said connecting duct in vicinity of said spin generator.

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**3,964,885**

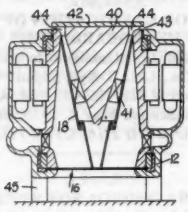
## CENTRIFUGAL PUMPS

**Harry Simister Bottoms, Solihull, and Leslie Holliday, Blackburn, both of England, assignors to Joseph Lucas (Industries) Limited, Birmingham, England**

**Filed June 18, 1974, Ser. No. 480,595**

**Int. Cl.² B01D** *47/00, 53/22*; **F04B** *17/00, 35/04*

**U.S. Cl. 55—203** **7 Claims**

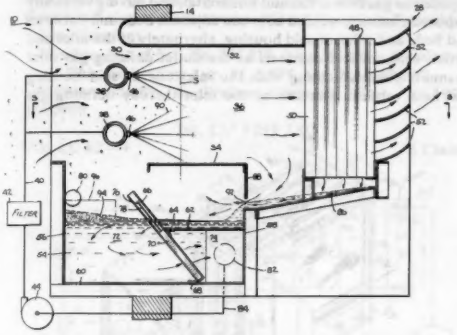


1. A pump comprising a rotor defining a pair of axially aligned frusto-conical chambers and a centrifucal impeller arrangement between said chambers, said impeller arrangement comprising means for urging a fluid radially outwardly of the axes of said frusto-conical chambers, the larger diameter of each chamber being adjacent the impeller arrangement and the smaller diameter of one of the chambers defining an inlet for the pump, a first hollow frusto-conical member having a through passage and being mounted coaxially within the other of the chambers so as to define an annular-section space therein, the smaller diameter of said first member being directed towards the impeller arrangement and the larger diameter of said first member engaging the smaller diameter of said other chamber, a stator surrounding said rotor, said rotor being freely rotatable within said stator about the axes of said frusto-conical chambers, a passage within the stator communicating with said impeller arrangement and with an outlet for the pump, a deflector having a conical surface and being mounted within said first member so as to define an annular space between said deflector and said first member, the apex of said conical surface being directed towards the pump inlet and the larger end of said deflector extending axially beyond the end of the stator remote from said inlet, the larger end of said deflector including a portion extending radially outwardly of said conical surface, a first group of a plurality of vanes extending between the larger diameter ends of the first member and the deflector, and a second group of a plurality of vanes extending between the first member and the deflector intermediate the ends thereof.

## 3,964,886
## GAS SCRUBBING APPARATUS

John Engalitcheff, Jr., Gibson Island, and Edward N. Schinner, Silver Spring, both of Md., assignors to Baltimore Aircoil Company, Inc., Jessup, Md.

Filed Oct. 29, 1974, Ser. No. 518,848
Int. Cl.² B01D 47/00
U.S. Cl. 55—228 15 Claims



1. Apparatus for scrubbing gas, said apparatus comprising a conduit having an entrance end and an exit end, nozzle means positioned near said entrance end of said conduit and arranged to spray liquid into said conduit toward its exit end, such spraying causing the injection of a gas from an enclosure into said conduit in a manner such that foreign particles to be cleaned from the gas are caught on the sprayed liquid, mist eliminator means arranged across the interior of the conduit downstream of the nozzle means to intercept the liquid spray therefrom, along with foreign particles caught on said spray, and to permit passage of the injected gas out through said exit end of the conduit, said mist eliminator means comprising a plurality of closely spaced parallel elongated strips of sheet material distributed across the cross section of the conduit and extending individually with one end higher than the other, and lying in planes parallel to the direction of gas flow through the conduit, said strips each having at least one bend extending along its length to intercept the sprayed liquid and to direct the liquid down toward its lower end, a sump arranged outside of and below said conduit and communicating with said conduit through a passageway, said sump including means for maintaining a given level of liquid therein and means forming a transfer surface extending from a position under said strips within said conduit to said sump outside said conduit, said transfer surface being inclined downwardly toward said sump with its uppermost edge located a finite distance below the bottom of said strips and its lowermost edge located a finite distance below its upper edge and said lowermost edge being in direct communication, therealong, with said sump outside said conduit, said sump being constructed and arranged to permit collection of foreign material which stratifies therein

## 3,964,887
## RADIOACTIVE GAS STANDBY TREATMENT APPARATUS WITH HIGH EFFICIENCY RECHARGEABLE CHARCOAL FILTER

Thomas Nelson Hickey, and Ivars Sigurds Spulgis, both of Columbus, Ohio, assignors to CVI Corporation, Columbus, Ohio

Division of Ser. No. 317,434, Dec. 21, 1972. This application Mar. 31, 1975, Ser. No. 563,768
Int. Cl.² B01D 50/00
U.S. Cl. 55—267 2 Claims

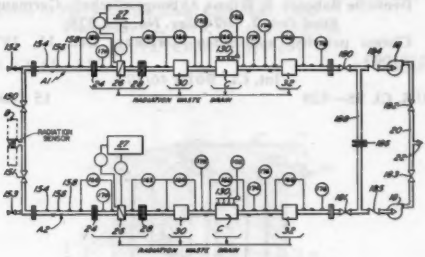
1. A standby gas treatment system for removal of radioactive contamination from the containment housing of a nuclear reactor in the event of a design basis or loss of coolant accident comprising:

at least one ventiduct train adapted to be coupled to the interior of the containment housing in the event of a nuclear incident,

means constituting a sensor for placing one ventiduct train in operative disposition and drawing a stream of gas therethrough when the level of radioactivity in the containment housing reaches a predetermined level,

demister means for removing free water droplets entrained in the incoming gas stream,

means for reducing the relative humidity of the stream of gas exiting from said demister means,



means for filtering particulate dust in excess of 0.3 microns size in the gas stream,

a charcoal adsorber in the downstream side of said means for filtering, said charcoal adsorber being so constructed and arranged as to develop a static head thereacross and squeeze the gas therethrough in laminar flow disposition,

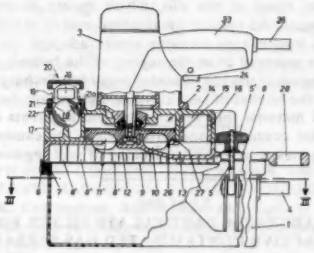
means constituting a higher efficiency particulate filter for removal of charcoal fines entrained in the gas stream upon passing through the adsorber, and

means for discharging the purified gas stream from the ventiduct to atmosphere.

## 3,964,888
## VACUUM SWEEPER

Reinhard Hahner, Kemnat; Wilbert Reibetanz, Leinfelden, and Karl Wanner, Echterdinge, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Sept. 25, 1974, Ser. No. 509,341
Claims priority, application Germany, Oct. 1, 1973, 2349338
Int. Cl.² B01D 50/00
U.S. Cl. 55—274 25 Claims



1. A vacuum cleaner, particularly for collecting borings, comprising a receptacle having a first opening for admission of a gaseous medium containing solid particles, a collecting chamber, and a discharging second opening; means for closing said second opening, including a cover connected to said receptacle and having a passage communicating with said collecting chamber; a side channel vacuum pump having an

inlet and an outlet, said passage communicating with said inlet, said pump being operative for inducing flow of the gaseous medium from said collecting chamber through said passage into said inlet and for discharging the same into said outlet; and silencing means including an annular elongated channel in said cover and enclosed except for one open end communicating with said outlet and another open end longitudinally spaced from said open end and communicating with the ambient atmosphere.

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**3,964,889**

## CONTINUOUS FILTER SILO FOR THE CLEANING OF FLUE GASES

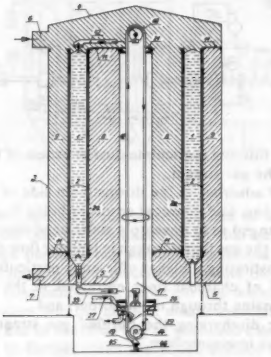
**Friedrich Lachnit, Mulheim (Ruhr), Germany, assignor to Deutsche Babcock & Wilcox Aktiengesellschaft, Germany**

**Filed Oct. 7, 1974, Ser. No. 512,975**

**Claims priority, application Germany, Oct. 11, 1973, 2351003**

**Int. Cl.² B01D *46/30***

**U.S. Cl. 55—429** **15 Claims**



1. In a continuous filter silo for the purification of flue gases by means of a filter layer located between two substantially vertically arranged wall sections of circular cross-section that are provided with apertures, wherein the filter material layer containers defined by said wall sections are subdivided into segments by means of at least four vertically arranged intermediate wall sections, and wherein means are provided for the controlled intake of flue gas in such a way that selected of said segments have have their exposure to flue gas stopped for the purpose of regeneration of the filter material the improvement comprising, a charging and emptying system positioned in the central inner space of the silo, which system is rotatably mounted around the vertical longitudinal axis of the silo and comprises a bucket-type elevator means adapted for transporting filter material from the region of the bottom of said silo to the region of the top of said silo and for discharging the contents of the bucket of said elevator onto means for transporting said material into selected of said segments of said filter material container, and drive means for causing said transporting means to move to selected of said segments.

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**3,964,890**

## RECHARGEABLE PARTICULATE FILTER FOR RADIOACTIVE CONTAMINATED GAS STREAMS

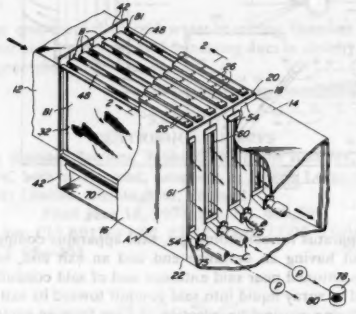
**John William Bonn, Columbus, Ohio, assignor to CVI Corporation, Columbus, Ohio**

**Filed June 3, 1974, Ser. No. 475,477**

**Int. Cl.² B01D *46/30***

**U.S. Cl. 55—479** **3 Claims**

1. In combination with a rechargeable gas filter of the type wherein a plurality of parallel laterally spaced vertically oriented generally parallelepiped filter beds are provided within a generally rectangular housing having a gas inlet and a gas outlet, wherein said beds each have two rectangular parallel vertical perforate walls for containing adsorbent material therebetween and having two vertical plates, one at the inlet side and the other at the outlet side, welded to said spaced perforate walls, two said vertical plates and two said perforate walls defining therein a single filter bed, said rectangular walls oriented with the sides of the rectangle vertical and horizontal, such that the bottom of the portion of the parallelepiped bed exposed to gas flow is flat and horizontal, and having vertically disposed channels welded between adjacent beds and between end beds and sides of said housing, alternately at the inlet and outlet, said vertical channels at the outlet defining gas inlet channels communicating with the inlet end of said housing and said vertical channels at the inlet thereby defining gas



exhaust channels communicating with the outlet of the housing such that the spaces between adjacent filter beds alternately are inlet channels and exhaust channels whereby for gas to pass from an inlet channel to an exhaust channel gas must pass through the two spaced perforate parallel walls of a filter bed, wherein means connect said beds with one another and with said housing so that gas passing from said inlet to said outlet must pass laterally through said perforate walls of one bed and adsorbent material contained therein, the improved means for evacuating said filter of adsorbent material which comprises:

a. a pair of longitudinally extending inwardly inclined funneling walls extending from bottom margins of adjacent filter beds entirely along the longitudinal length thereof, each wall of said pair extending downwardly and inwardly from an outer perforate wall of one of the adjacent filter beds, said pair of funneling walls forming a downwardly diverging discharge chute remote from the filter beds extending the length of the filter beds, said discharge chute being of greater length at one end of said filter beds and of lesser length at an opposite end of said filter beds;

b. channel means laterally extending exterior of said discharge chute along the entire longitudinal length thereof;

c. a well extending longitudinally the length of said discharge chute thereby encapsulating said discharge chute, secured to said channel means;

d. a pipe extending in the longitudinal direction from the end of said well where said discharge chute is of greater length; and

e. port means in the top of said housing for the introduction of adsorbent material to the filter therethrough;

whereby when said filter is filled with granular adsorbent through said port means, granular adsorbent from said adjacent filter beds above said funneling walls will fall through said discharge chute and form a heap on the portion of said well below said discharge chute along the entire longitudinal length thereof until the angle of repose of the heap of particulate granular adsorbent closes the discharge chute;

whereby when suction is applied to said pipe granular adsorbent in said well will be progressively drawn through said

pipe, with granular adsorbent remote from said pipe in said well being drawn out first, such that all granular adsorbent in said adjacent filter beds above said funneling walls will be removed therefrom with the adsorbent in a corner of the parallelepiped most remote from the pipe being removed first.

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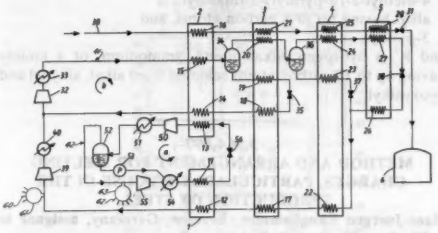
3,964,891

## PROCESS AND ARRANGEMENT FOR COOLING FLUIDS

Heinrich Krieger, Leitlestrasse 16, 81 Garmisch-Partenkirchen, Germany

Continuation of Ser. No. 392,810, Aug. 29, 1973, abandoned.
This application Apr. 11, 1975, Ser. No. 567,407
Claims priority, application Germany, Sept. 1, 1972, 2242998
Int. Cl.² F25J 1/02
U.S. Cl. 62—9 5 Claims



1. A process for cooling fluids, particularly for liquefying gaseous substances, comprising conveying a cooling fluid mixture capable of existing in a liquid and a vapor state along a first path including a first section in which said cooling fluid is cooled, and a second section downstream of said first section which is substantially thermally separated from said first section; conveying a precooling fluid mixture capable of existing in a liquid and a vapor state along a second path including a first part which is substantially thermally separated from said first section and is arranged in heat-exchange relationship with said second section and wherein said precooling fluid flows countercurrent to said cooling fluid in said second section so as to be supercooled thereby, and said second path also including a second part downstream of said first part which is arranged in heat-exchange relationship with said first section and wherein said precooling fluid flows countercurrent to said cooling fluid in said first section and cools the same, the composition of said precooling fluid being so selected that the cooling curve of the cooling fluid in said first section and the heating curve of the precooling fluid in said second part plotted in terms of temperature versus enthalpy approximate one another; compressing said cooling fluid upstream of said first section while said cooling fluid is in its vapor state; cooling the compressed cooling fluid upstream of said first section with a surrounding cooling medium, the compressed cooling fluid being in the form of superheated vapor upon entering said first section and being partially condensed to its liquid state in said first section by the precooling fluid in said second part; separating said cooling fluid into its liquid and vapor components subsequent to said partial condensation and at least partially condensing said vapor component to its liquid state; reducing the pressure of the condensed cooling fluid upstream of said second section, the reduced pressure cooling fluid entering said second section so as to supercool the precooling fluid in said first part and being substantially entirely in its vapor state in said second section; repeating the preceding four steps with the heated and vaporized cooling fluid; compressing said precooling fluid upstream of said first part while said precooling fluid is in its vapor state; cooling the compressed precooling fluid upstream of said first part with a surrounding cooling medium so as to condense said precooling fluid to its liquid state, the condensed precooling fluid being supercooled in said first part by the cooling fluid in said second section; reducing the pressure of the supercooled precooling fluid upstream of said second part, the reduced pressure precooling fluid entering said second part at a temperature substantially equal to at least its boiling point temperature so as to cool the cooling fluid in said first section thereby being heated and vaporized to its vapor state; and repeating the preceding three steps with the heated and vaporized precooling fluid.

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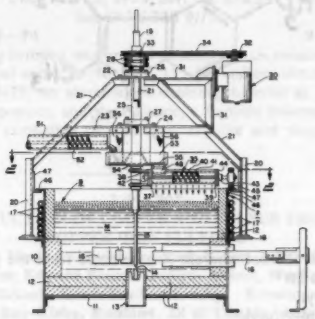
3,964,892

## APPARATUS FOR ADVANCING PARTICULATE MATERIAL

Ray F. Schumacher, Peninsula; David J. Prasek, Parma, both of Ohio, and Howard L. Van Stone, Nashville, Tenn., assignors to Ferro Corporation, Cleveland, Ohio

Filed May 12, 1975, Ser. No. 576,706
Int. Cl.² C03B 5/26, 3/00
U.S. Cl. 65—328 17 Claims



1. Glass melting apparatus and means for advancing particulate material to said apparatus, comprising: a glass-melting receiver adapted to melt the material having an inlet to receive it and an outlet to discharge molten glass, cane means reciprocably mounted above the receiver and in substantially vertical alignment with said outlet adapted to move axially in either direction into and out of said outlet to close and open the outlet and thereby affect said molten glass discharge, hollow drive shaft means telescopically receiving the cane means and supported with respect to the receiver for rotary movement about a longitudinal axis while accomodating said axial movement of the cane means, means to rotate the shaft means, a distributing arm secured to the drive shaft means to turn therewith and extending from a central area of said inlet of the receiver to a peripheral area of the inlet, said arm having trough means to receive said material which extends longitudinally along the arm, means for advancing said material along said trough means, exit means on said arm to release the material from the arm through said inlet, and roller means on the outer end of said distributing arm adapted to ride about the periphery of said inlet.

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3,964,893

## LAWN MOSS CONTROL WITH FERRIC AMMONIUM SULFATE-AMMONIUM SULFATE DOUBLE SALTS

John R. Everingham, San Rafael, and Karl A. Hoenke, El Cerrito, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed Sept. 30, 1974, Ser. No. 510,676
Int. Cl.² A01N 11/00
U.S. Cl. 71—65 5 Claims

1. A method for the control of lawn moss in turf grass which comprises applying to said lawn moss ferric ammonium sulfate-ammonium sulfate double salt of the empirical formula $(NH_4)_3Fe(SO_4)_3 \cdot xH_2O$ wherein $x$ is 0 to 12 at a rate of about 0.3 to 1 pound Fe per 1000 ft² of lawn turf.

3,964,894

## METHOD OF CONTROLLING PLANT GROWTH

Géza Tóth; Gábor Szabó; György Eibel, and Éva Somfai, all of Budapest, Hungary, assignors to Chinoin Gyogyszer-es Vegyeszeti Termekek Gyara RT, Budapest, Hungary

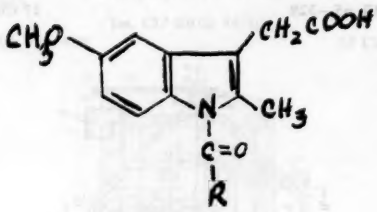
Continuation-in-part of Ser. No. 168,443, Aug. 2, 1971, abandoned. This application Apr. 8, 1974, Ser. No. 458,999

Claims priority, application Hungary, July 31, 1970, CI 1017

Int. Cl.[2] A01N 9/22

U.S. Cl. 71—90 6 Claims

1. A process for promoting plant growth comprising applying to the plant site after seeding an effective amount of a compound of the formula



or a salt thereof wherein R is selected from the group wich consists of:

2-furyl,
5-nitro-2-furyl,
2-bromothiazol-4-yl, and
2-chlorothiazol-4-yl.

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3,964,895

## THIADIAZOLYLIMIDAZOLIDINONE HERBICIDES

John Krenzer, Oak Park, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Filed Feb. 18, 1975, Ser. No. 550,388

Int. Cl.[2] A01N 9/12

U.S. Cl. 71—90 2 Claims

1. A herbicidal composition comprising an inert carrier and, as an essential active ingredient, in a quantity toxic to weeds the compound 1-(5-t-butyl-1,3,4-thiadiazol-2-yl)-3-methyl-5-hydroxy-1,3-imidazolidin-2-one.

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3,964,896

## OXADIAZOLE BENZOIC ACID DERIVATIVES AS HERBICIDES

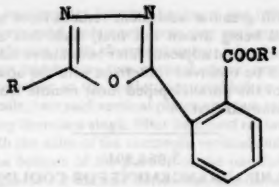
Walter G. Brouwer, Guelph; Edwin J. MacPherson, Elmira, both of Canada; Ronald B. Ames, Naugatuck, and Robert W. Neidermyer, Cheshire, both of Conn., assignors to Uniroyal, Inc., New York, N.Y.

Division of Ser. No. 170,263, Aug. 9, 1971, Pat. No. 3,882,138. This application Feb. 5, 1975, Ser. No. 547,155

Int. Cl.[2] A01N 9/22

U.S. Cl. 71—92 6 Claims

1. A method of controlling weeds which comprises applying to a locus containing weed seeds or supporting weed growth a herbicidally effective amount of a chemical having the structural formula



wherein R is selected from the group consisting of

phenyl,
phenyl substituted with up to three substituents wherein the substituents are halo, nitro, alkyl having up to 4 carbon atoms or alkoxy having up to 4 carbon atoms,
4-methyl-2-(3-pyridyl)-5-thiazolyl,
alkyl having up to 6 carbon atoms, and
3-pyridyl;

and R′ is hydrogen, alkali metal, ammonium, or a moiety having up to 12 carbon atoms selected from alkyl, alkynyl and epoxyalkyl.

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3,964,897

## METHOD AND ARRANGEMENT FOR MELTING CHARGES, PARTICULARLY FOR USE IN THE PRODUCTION OF STEEL

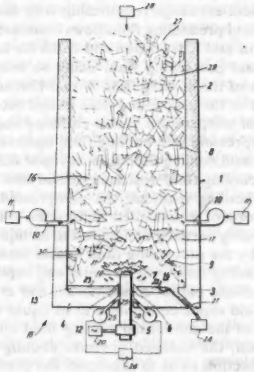
Hans-Juergen Langhammer, Bremen, Germany, assignor to Klockner-Werke AG, Duisburg, Germany

Continuation-in-part of Ser. No. 337,736, March 2, 1973, Pat. No. 3,789,309 which is a continuation-in-part of Ser. No. 337, 738, filed March 2, 1973, Pat. No. 3,894,864. This application Aug. 26, 1974, Ser. No. 500,662

Claims priority, application Germany, Aug. 25, 1973, 2343051; Aug. 25, 1973, 2342947

Int. Cl.[2] C22B 4/00; H05B 7/18

U.S. Cl. 75—10 R 37 Claims

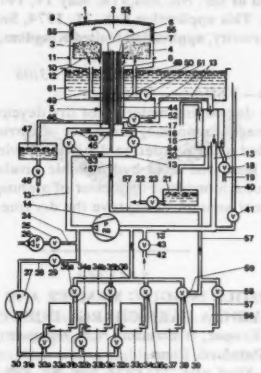


29. An arrangement as defined in claim 13, wherein said chamber has an at least approximately constant cross-section.

## 3,964,898
## PROCESS FOR BATCH PRODUCTION OF SPONGE IRON

Hans Edward Henrik Murray, Djursholm, Sweden, assignor to SKF Nova AB, Gothenburgh, Sweden

Filed May 5, 1975, Ser. No. 574,576
Claims priority, application Sweden, May 9, 1974, 7406175
Int. Cl.² C22D 7/04
U.S. Cl. 75—11 34 Claims



1. A process for batch production of sponge iron, comprising a charging step, during which an oxide material of the iron is arranged as a stationary bed in a furnace chamber, at least one heating step, during which a hot atmosphere is caused to flow through said stationary bed for heating the same, and at least one reduction step, during which hot reducing atmosphere is caused to flow through said stationary bed of oxidic material for reducing the same to sponge iron, comprising heat exchanging, during the heating step and the reduction step, the relatively hot used atmosphere, which has just passed through the stationary bed, substantially in counter-current with relatively cold fresh atmosphere in order to preheat the cold atmosphere before introducing it into the furnace chamber directly after the heat exchange.

## 3,964,899
## ADDITIVES TO IMPROVE SLAG FORMATION IN STEELMAKING FURNACES

Evan Thomas Richard Jones, and Robert Anthony Fishburn, both of Birmingham, England, assignors to Foseco International Limited, Birmingham, England

Filed Nov. 20, 1974, Ser. No. 525,668
Claims priority, application United Kingdom, Dec. 12, 1973, 57604/73
Int. Cl.² C21C 7/00; C22B 9/10
U.S. Cl. 75—53 18 Claims

1. A composition for use in the refining of steel as a dry additive to be added with lime to promote dissolution of lime in slag, said additive being in essentially solid form and consisting essentially of, by weight, at least 20% alumina, and at least one oxide selected from the class consisting of iron oxide, magnesium oxide, manganese oxide and titanium oxide, the said additive having a melting point of less than 1600°C.

## 3,964,900
## SLAG-FORMING MIXTURE

Leonid Isaakovich Krupman, ulitsa R. Ljuxemburg, 30a, kv. 17; Ary Mikhailovich Okonishnikov, ulitsa Naberezhnaya, 117a, kv. 86; Alexandr Egorovich Sochnev, ulitsa Naberezhnaya, 147, kv. 2; Boris Viktorovich Gavronsky, Bulvar Shkolny, 21, kv. 30; Viktor Alexeevich Popov, prospekt Ilicha, 85, kv. 159; Anatoly Nikolaevich Kalashnik, ulitsa Krasnoflotskaya, 98, kv. 39; Vasily Sergeevich Chumachenko, prospekt Ilicha, 85, kv. 116; Veniamin Mikhailovich Gudkevich, bulvar Shevchenko, 69, kv. 32; Georgy Alexeevich Panev, ulitsa Gorkogo, 154, kv. 4; Vasily Ivanovich Detochka, ulitsa Polotskaya, 20g, kv. 24; Savely Adolfovich Telesov, bulvar Shkolny, 13, kv. 29; Leonid Moiseevich Pokrass, ulitsa Pionerskaya, 98; Abram Mikhailovich Ofengenden, ulitsa Tkachenko, 135, kv. 20; Raisa Petrovna Nesterovich, bulvar Pushkina, 25, kv. 11, and Georgy Gavrilovich Zhitnik, bulvar Pushkina, 25, kv. 21, all of Donetsk, U.S.S.R.

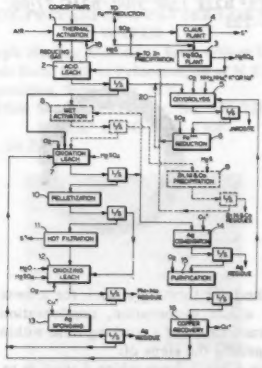
Filed Mar. 3, 1975, Ser. No. 554,541
Int. Cl.² C22B 9/10
U.S. Cl. 75—94 9 Claims

1. A slag-forming mixture for refining metals consisting of, in weight per cent,: 30–70, lime; 15 – 30, sodium nitrate as an oxidizer; 8–25, an aluminum-containing material as an oxidized component; and the balance, a fluoride selected from the group consisting of fluorspar, cryolite and magnesium fluoride.

## 3,964,901
## PRODUCTION OF COPPER AND SULFUR FROM COPPER-IRON SULFIDES

Godefridus Maria Swinkels, Rossland; Robert Arthur Furber, Edmonton; Edward Francis Godfrey Milner, Warfield; Roman Michael Genik-Sas-Berezowsky, Edmonton, and Charles Ray Kirby, Rossland, all of Canada, assignors to Sherritt Gordon Mines Limited, Toronto and Cominco Ltd., Vancouver, both of, Canada

Filed Oct. 19, 1973, Ser. No. 408,132
Int. Cl.² C22B 1/11, 15/12, 61/00; C01B 17/06
U.S. Cl. 75—108 28 Claims



1. A process for treating metal sulfides containing iron and non-ferrous metals including copper for bulk removal of the iron content therefrom and for rendering copper and other non-ferrous metal values amenable for separate recovery, which comprises the steps of: heating said metal sulfides in a heating zone to an elevated temperature in a substantially non-oxidizing atmosphere for removal of labile sulfur; contacting said delabilized sulfides in a reducing zone with a

reducing gas capable of accepting sulfur to convert sulfidic iron in said sulfides to an acid leachable form, said reducing gas countercurrently contacting said delabilized sulfides; controllably burning combustible reaction products and labile sulfur therefrom with sufficient oxygen to provide heat for said heating step and to convert sulfur values to $SO_2$ for discharge from the said heating step; subjecting said sulfides to an acid leach in aqueous sulfuric acid to produce a solution of ferrous sulfate and a solids residue containing copper and iron in a molar ratio of at least about 1:1 with concurrent evolution of $H_2S$ gas; discharging said ferrous sulfate and solids residue for subsequent separation, recovery of non-ferrous metal values and for production of sulfuric acid for recycle to said acid leach; combusting a portion of said $H_2S$ gas; combining the combusted $H_2S$ with $SO_2$ from said heating step for the production of at least a portion of the sulfuric acid required in said acid leach; combining remaining $H_2S$ with remaining $SO_2$ from said heating step for the production of elemental sulfur, and controlling said production of sulfuric acid and elemental sulfur to supply acid requirements for the acid leach step and to produce excess sulfur as elemental sulfur.

**17.** A process as claimed in claim **1**, subjecting the solids residue from the acid leach to an acid oxidation leach in an aqueous solution of sulfuric acid for oxidation of sulfide sulfur to elemental sulfur and for solution of copper as cupric ion to form a copper sulfate solution.

**27.** A process as claimed in claim **17**, recovering metallic copper from said copper sulfate solution by hydrogen reduction comprising reacting the solution containing about 80 gpl Cu with hydrogen gas at a temperature within the range of from about 130° to 200°C. at a hydrogen partial pressure of from about 300 to about 400 psi for production of metallic copper, and recycling residual solution to the oxidation leach.

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**3,964,902**

**METHOD OF FORMING A WICK FOR A HEAT PIPE**

**James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of; Frank G. Arcella, Bethel Park, Pa.; Ernest C. Phillips, Jr., Smithton, Pa., and Richard P. Sprecace, Murrysville, Pa., assignors to The United States of America as represented by the United States National Aeronautics and Space Administration, Washington, D.C.**

**Filed Feb. 27, 1974, Ser. No. 446,567**

**Int. Cl.[2] B22F** *1/00, 3/00;* **B21C** *37/00; 39/06*

**U.S. Cl. 75—225** **1 Claim**

**1.** A method for forming a wick for a heat transfer pipe adapted to utilize evaporation, condensation and surface tension characteristics of a working fluid within a closed ocntainer, comprising the steps of:

A. forming a blank from which a wick is to be shaped by folding a sheet of metallic screen of fine mesh into superimposed layers, uniting said superimposed layers by spotwelding the layers together, saturating said layers with water, and flat rolling the layers while in a saturated condition, whereby said blank is plasticized for reducing the size of the mesh opening;

B. permanently deforming the blank into a cylindrical structure by wrapping the blank about an inner mandrel and inserting the inner mandrel into an outer mandrel of a cylindrical configuration and swaging the mandrels and the blank;

C. disassociating the mandrels from the blank by selectively etching the mandrels; and

D. sintering the blank by subjecting the blank to elevated temperatures in a high vacuum environment.

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**3,964,903**

**DEVELOPMENT OF ELECTROSTATIC IMAGES**

**Jan Frans Van Besauw, Brasschaat; Noel Jozef De Volder, Edegem; Jozef Leonard Van Engeland, St. Katelijne-Wayer, and Albert Lucien Poot, Kontich, all of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium**

**Division of Ser. No. 254,916, May 19, 1972, Pat. No. 3,817,868. This application Feb. 21, 1974, Ser. No. 444,502**

**Claims priority, application United Kingdom, May 21, 1971, 16345/71**

**Int. Cl.[2] G03G** *5/10, 13/08*

**U.S. Cl. 96—1 SD** **17 Claims**

**1.** A dry developing material for dry development of electrostatic images comprising a mixture of carrier particles and finely divided toner powder, said mixture having incorporated therein at least one solid hydrophobic bivalent or trivalent metal salt of a monoester or diester of a phosphorus oxyacid in a sufficient amount to improve the dry free-flowing nature thereof.

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**3,964,904**

**MANIFOLD IMAGING MEMBER AND PROCESS EMPLOYING A DARK CHARGE INJECTING LAYER**

**Joseph M. Kropac, Williamson, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Aug. 22, 1974, Ser. No. 499,683**

**Int. Cl.[2] G03G** *5/00, 13/00, 17/00*

**U.S. Cl. 96—1.5** **16 Claims**

**1.** An imaging member comprising a donor layer and a receiver layer and sandwiched therebetween an integral electrically photosensitive imaging layer comprising electrically photosensitive materials and a thermo-activator for said imaging layer dispersed in an electrically insulating binder, said thermo-activator being a material different from the binder, and having a melting point lower than the binder so as to structurally weaken the cohesive strength of the imaging layer in response to heating, and sandwiched between the imaging layer and either the donor or receiver layer, layer of a dark charge injecting material, said dark charge injecting material being capable of injecting a uniform charge of one polarity into the electrically photosensitive imaging layer while under an electric field in the dark, and at least one of said donor and receiver layers being at least partially transparent to electromagnetic radiation to which said imaging layer is sensitive.

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**3,964,905**

**COLOR PHOTOGRAHIC MATERIAL HAVING A BLEACH INHIBITOR THEREIN DEFINING A SOUND TRACK**

**Takeshi Hirose; Yasushi Oishi, and Tadao Sakai, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan**

**Filed Mar. 13, 1974, Ser. No. 450,938**

**Claims priority, application Japan, Mar. 13, 1973, 48-29252**

**Int. Cl.[2] G03C** *7/24*

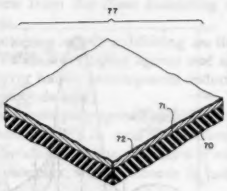
**U.S. Cl. 96—4** **23 Claims**

**1.** An unexposed and unprocessed color photographic material comprising a support having thereon one or more silver halide color emulsion layers containing a coupler capable of forming a dye by reaction with the oxidation product of an aromatic primary amino developing agent and at least one of the emulsion layers of the color emulsion layers of the color photographic material containing a bleach inhibitor defining a sound track portion of said photographic material.

## 3,964,906
## METHOD OF FORMING A HYDROPHOBIC SURFACE BY EXPOSING A COLLOIDAL SOL TO UV RADIATION

John Thomas Kenney, Lawrence Township, Mercer County, N.J., assignor to Western Electric Company, Inc., New York, N.Y.

Division of Ser. No. 424,015, Dec. 12, 1973, Pat. No. 3,949,121. This application Sept. 26, 1975, Ser. No. 617,258
Int. Cl.² G03F 7/02
U.S. Cl. 96—33 2 Claims




1. A method of forming a hydrophobic surface pattern on a surface, which comprises:

coating the surface with a stable aqueous colloidal wetting sol, formed by a hydrolysis and nucleation reaction, comprising insoluble hydrous oxide particles of an element selected from the group consisting of Be, In, Cr, Fe, Co, Ni, Tl, Cu, Zn, Sn and mixtures thereof, to form a coated surface of hydrophilic character; and

selectively exposing said coated surface to a source of ultraviolet radiation having a wavelength ranging from 1800A to 3300A to render exposed portions hydrophobic to form the hydrophobic surface pattern.

2. A method of preparing a printing master, which comprises:

a. coating a surface with a stable aqueous colloidal wetting sol, formed by a hydrolysis and nucleation reaction, comprising insoluble hydrous oxide particles of an element selected from the group consisting of Be, In, Cr, Fe, Co, Ni, Tl, Cu, Zn, Sn and mixtures thereof to form a coated surface of hydrophilic character, to form a coated surface of hydrophilic character; and

b. selectively exposing portions of said coated, hydrophilic surface to a source of ultraviolet radiation having a wavelength ranging from 1800A to 3300A to render regions thereof hydrophobic and to delineate an ink retaining surface pattern.

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## 3,964,907
## METHOD FOR THE PREPARATION OF RELIEF PRINTING MASTERS

Dana G. Marsh, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 415,288, Nov. 12, 1973, abandoned. This application Sept. 2, 1975, Ser. No. 609,339
Int. Cl.² G03G 5/00, 1/68; B31B 1/76
U.S. Cl. 96—35 13 Claims

1. A method for the preparation of a relief printing master which comprises exposing a printing plate to actinic radiation in an imagewise manner, wherein said plate comprises a substrate having on its surface a film of a composition comprising:

a. a degradable polymer containing segments characterized by the structural formula:

wherein R is H, an alkyl hydrocarbon radical of 1 to 6 carbon atoms, a chlorinated or fluorinated aliphatic hydrocarbon of 1 to 6 carbon atoms or a cyano substituted aliphatic hydrocarbon radical of 1 to 5 carbon atoms and,

b. a photosensitizer which is capable upon exposure to actinic radiation of assuming the $^3(n,\pi^*)$ or $^1(n,\pi^*)$ state and extracting a hydrogen atom from the polymer backbone, thereby causing the polymer to degrade and form depressions in the film in the exposed areas.

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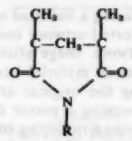
## 3,964,908
## POSITIVE RESISTS CONTAINING DIMETHYLGLUTARIMIDE UNITS

Joachim Bargon, Los Gatos; Edward Gipstein, Saratoga, and Hiroyuki Hiraoka, Los Gatos, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 22, 1975, Ser. No. 615,652
Int. Cl.² G03C 5/00, 5/24
U.S. Cl. 96—35.1 10 Claims

1. A process for forming an image with a positive resist, said process comprising the steps of:

1. forming on a substrate a film of a composition comprising a polymer containing the structural unit



wherein R is H, $CH_3$ or $C_2H_5$,

2. exposing said film in a predetermined pattern to radiation,

3. removing the radiation exposed portion of said film with a solvent.

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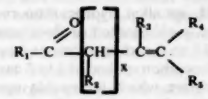
## 3,964,909
## METHOD OF PREPARING A PATTERN ON A SILICON WAFER

Richard Joseph Himics, Skillman; Scott Oliver Graham, and Daniel Louis Ross, both of Princeton, all of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Mar. 6, 1975, Ser. No. 555,728
Int. Cl.² G03C 5/00, 1/68
U.S. Cl. 96—36.2 5 Claims

1. In a method of preparing a pattern on a silicon oxide-coated silicon wafer which comprises applying a photoresist film to said oxide layer, exposing said photoresist to a light pattern, developing said exposed photoresist to remove ex-

posed portions thereof, thereby uncovering portions of the oxide layer, etching said wafter to remove the uncovered oxide layer and removing the remaining photoresist, the improvement which comprises employing as the photoresist a film of a copolymer of $SO_2$ and keto-olefin of the formula:



wherein $R_1$ is alkyl, aryl or substituted aryl; $R_2$ is hydrogen or methyl; $x$ is an integer of 1 or 2; $R_3$ is hydrogen or is part of a carbocyclic ring with $R_4$ or $R_5$, with the proviso that when $x$ is 2, $R_3$ is hydrogen; $R_4$ is hydrogen, alkyl, or aryl and $R_5$ is hydrogen or, when $R_4$ is hydrogen, is alkyl or aryl, or $R_4$ and $R_5$ together are part of a carbocyclic ring.

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**3,964,910**

## PRINTING OF DEEP DRAWN CONTAINERS WITH IMAGES REFLECTED FROM INSIDE OF CYLINDER

**Robert Geist, Kempten, and Franz Benedikt, Rudolph Hamburg, both of Germany, assignors to Lever Brothers Company, New York, N.Y.**

**Filed Dec. 13, 1974, Ser. No. 532,444**

**Claims priority, application Germany, Dec. 20, 1973, 2363551**

**Int. Cl.² G03C *11/00*; G03B *27/58*, *27/48*, *27/50***

**U.S. Cl. 96—46** **5 Claims**

1. A process for producing a distorted artwork image on flat stock material, the distorted artwork image being such as to provide the desired artwork image after being stretched by deep drawing the flat stock material into the desired shape, comprising representing the original artwork on the inner walls of a cylinder, disposing a mirror co-axially within the cylinder, the mirror having a reflecting surface inclined to the axis of the cylinder, photographing a distorted image of the artwork as reflected in the mirror, and printing the distorted image on the flat stock material.

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**3,964,911**

## PHOTOGRAPHIC REPRODUCTION PROCESSES USING DIAZONIUM SALTS AND SUBSTITUTED SPIRO[BENZOPYRANE]

**Jean Jules Achille Robillard, Ferney Voltaire, France, assignor to La Cellophane, Paris, France**

**Filed Dec. 18, 1973, Ser. No. 425,866**

**Claims priority, application France, Dec. 22, 1972, 72.27090**

**Int. Cl.² G03C *5/18*, *5/34*, *5/24***

**U.S. Cl. 96—49** **9 Claims**

1. A photographic process for dry developing a negative image of an original containing image areas and non-image transparent areas comprising

a. placing said original over a photosensitive layer carried on a base layer, said photosensitive layer comprising a homogeneous mixture of

i. at least one diazonium salt photodecomposable into phenol; and

ii. at least one spiropyran compound photodecomposable into merocyanine, said spiropyran compounds selected from the group consisting of indolyl-2-spiro(benzo-1-pyrane) compounds and benzothiazole-2-spiro(benzo-1-pyrane) compounds wherein the molar ratio of said diazonium salt (i) to said spiropyran compound (ii) is from 0.7 –2.6:1; and

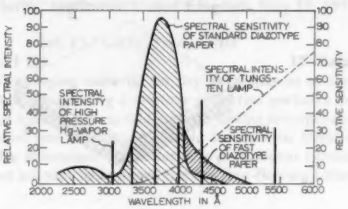
iii. from 0–65 percent by weight, based on the total of (i), (ii) and (iii) of a normally solid material having a melting point lower than about 150°C and which when in the molten state is a solvent for said phenol and said merocyanine,

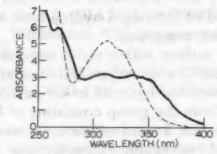
b. subjecting said photosensitive layer to imagewise exposure of actinic radiation whose emission spectrum encompasses the absorption bands of both said at least one diazonium salt of (a) (i) and of said at least one spiropyran compound of (a) (ii) to thereby produce said phenol and said merocyanine in the exposed areas;

c. heating said photosensitive layer until both of said phenol and said merocyanine are substantially completely dissolved or melted; and

d. allowing the formation of a colored complex of said phenol and said merocyanine in the exposed areas to thereby form a negative image of said original.

4. A photographic process for dry developing a positive image of an original containing image areas and non-image transparent areas comprising


RELATIVE SPECTRAL INTENSITY
RELATIVE SENSITIVITY
SPECTRAL SENSITIVITY OF STANDARD DIAZOTYPE PAPER
SPECTRAL INTENSITY OF TUNGSTEN LAMP
SPECTRAL INTENSITY OF HIGH PRESSURE Hg-VAPOR LAMP
SPECTRAL SENSITIVITY OF FAST DIAZOTYPE PAPER
WAVELENGTH IN Å




a. subjecting a photosensitive layer carried on a base layer, said photosensitive layer comprising a homogeneous mixture of

i. at least one diazonium salt photodecomposable into phenol; and

ii. at least one spiropyran compound photodecomposable into merocyanine, said spiropyran compounds selected from the group consisting of indolyl-2-spiro(benzo-1-pyran) compounds and benzothiazole-2-spiro(benzo-1-pyrane)compounds wherein the molar ratio of said diazonium salt (i) to said spiropyran compound (ii) is from 0.7-2.6:1; and

iii. from 0–65 percent by weight, based on the total of (i), (ii), and (iii) of a normally solid material having a melting point lower than about 150°C and which when in the molten state is a solvent for said phenol and said merocyanine; to actinic radiation whose emission spectrum encompasses both the absorption band of said at least one diazonium salt of (i) and of said at least one spiropyran compound of (ii) to thereby produce said phenol and said merocyanine;

b. placing said original over said exposed photosensitive layer;

c. subjecting said photosensitive layer to image-wise exposure of actinic radiation whose emission spectrum encompasses the absorption band of said merocyanine to thereby reconvert said merocyanine to said spiropyran in said re-exposed areas;

d. heating said photosensitive layer until both of said phenol and said merocyanine are completely melted or dissolved; and

e. allowing the formation of a colored complex of said phenol and said merocyanine in the areas corresponding to the image areas of the original to thereby form a positive image of said original.

3,964,912

## RUTHENIUM CONTAINING PHOTOGRAPHIC DEVELOPERS

**Harry J. Price, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Continuation of Ser. No. 504,596, Sept. 9, 1974, abandoned, and a continuation-in-part of Ser. No. 483,252, June 26, 1974, abandoned. This application Dec. 29, 1975, Ser. No. 645,104**

**Int. Cl.² G03C** *5/30*

**U.S. Cl. 96—66.3** **24 Claims**

1. A composition useful in developing silver halide photographic elements comprising

at least one silver halide developing agent and

a development accelerating amount of at least one ruthenium(III) or (II) cationic complex including at least four ligands chosen from the class consisting of ammine or amine ligands,

each said developing agent exhibiting in the absence of other silver halide developing agents and said ruthenium complex a silver halide development induction period in excess of 5 seconds and

at least one said developing agent exhibiting a rate of reduction of ruthenium(III) in said ruthenium(III) cationic complex, or produced by the oxidation of said ruthenium-(II) cationic complex, which exceeds its rate of reduction of silver halide.

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3,964,913

## STAINLESS STEEL POLISH

**Charles David Nighy, c/o Catercraft (Sussex) Ltd., 18 Old Mill Square, Starrington, Sussex, England**

**Continuation-in-part of Ser. No. 390,559, Aug. 22, 1973, abandoned. This application Sept. 30, 1974, Ser. No. 510,158**

**Int. Cl.² C09G** *1/02*

**U.S. Cl. 106—10** **7 Claims**

1. A paste-like polishing composition for stainless steels and the like consisting essentially of water, alumina powder, an aliphatic monohydric alcohol having from 12 to 20 carbon atoms and a waxy condensation product of ethylene oxide and of an aliphatic monohydric alcohol having from 12 to 20 carbon atoms; said alumina powder constituting from about 40 to 50 parts, said aliphatic alcohol constituting from about 7 to 20 parts, said polyoxyethylated alcohol constituting from about 7 to 10 parts, and said water constituting from 27 to 30 parts, all by volume per 100 parts by volume of said composition.

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3,964,914

## ELECTROMARKING SOLUTION

**Jonathan S. Bullock, Oak Ridge; William L. Harper, Wartburg, and Charles G. Peck, Oak Ridge, all of Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed Aug. 16, 1974, Ser. No. 498,146**

**Int. Cl.² C09D** *11/00*

**U.S. Cl. 106—19** **3 Claims**

1. An aqueous halogen-free electromarking solution consisting essentially of a water-soluble nitrate salt of an amphoteric metal selected from the group consisting of zinc, aluminum and tin in a concentration of about 0.085 to 0.139 mole per liter of solution, a chelating agent consisting of a water-soluble compound for complexing free metal ions in said solution with said chelating agent being in the solution with a concentration range of about 0.071 to 0.103 mole per liter of solution, and having an anion contributor selected from the group consisting of citrate, tartrate, oxalate, and ethylenediamine-tetraacetic acid, a corrosion-inhibiting agent in a concentration of 0.017 to 0.031 mole per liter of solution and selected from the group consisting of alkali metal chromates, dichromates, molybdates, tungstates, technetiates, vanadates, peroxydisulphates, and ethylenediamine, and paraformaldehyde, and a solution pH in the range of 2.3 to 10.0.

3,964,915

## INVESTMENT WAX

**Richard E. Doenges, North Alliance, and James E. Amelung, Minerva, both of Ohio, assignors to TRW Inc., Cleveland, Ohio**

**Filed Dec. 26, 1974, Ser. No. 536,634**

**Int. Cl.² B28B** *7/34;* **C08L** *91/06*

**U.S. Cl. 106—38.6** **6 Claims**

1. In a pattern composition characterized by a low injection temperature, a low coefficient of expansion and insubstantial cavitation after injection into a pattern die comprising waxes, fatty acids, and thermoplastic resins, the improvement comprising as said ingredients: the composition consisting essentially of

1. 47 to 53% by weight of a mixture of stearic and palmitic acids of which 43 to 98% by weight is stearic acid,
2. wax in the amount of about 9 to 11% by weight,
3. about 31 to 35% by weight of a thermoplastic resin having a ball and ring melting point in the range of 90° to 125°C said resin being compatible with said wax and acids,
4. from 2.5 to 3.5% by weight of a fatty acid amide containing 12 to 22 carbon atoms per molecule which functions as a release agent and intercrystalline slip agent, and
5. from 1.5 to 2.5% by weight of aluminum polystearate and/or magnesium distearate.

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3,964,916

## CASTING POWDER

**William H. Armistead; Dominic P. Mamazza, both of Corning, N.Y.; David Rostoker, Monroeville, Pa., and Frank E. Woolley, Painted Post, N.Y., assignors to Corning Glass Works, Corning, N.Y.**

**Filed Dec. 13, 1974, Ser. No. 532,328**

**Int. Cl.² C03C** *3/04;* **B22D** *11/00*

**U.S. Cl. 106—38.27** **10 Claims**

5. A method of making a particulate casting material to be applied onto the upper surface of molten steel in a vertical continuous casting mold therefor and comprising thoroughly mixing batch materials that melt on the surface of the molten steel to form a protective flux-lubricant molten glass covering which also flows down between the solidifying cast steel and the mold wall,

wherein the improvement comprises

a. thoroughly and intimately mixing a batch having an aggregate particle sizing by weight of:

at least 75% −120 mesh U.S. Standard Sieve,

at least 60% −200 mesh U.S. Standard Sieve,

analytically consisting essentially of, by weight:

20–45% $SiO_2$,

10–40% CaO, SrO, BaO and combinaions thereof,

0–10% $Al_2O_3$

0–11% $Fe_2O_3$

5–25% $Na_2O$, $K_2O$ and combinations thereof,

0–15% MgO,

3–15% fluorine ion,

0–3% $TiO_2$, and

b. heating the mixed batch at temperature of at least 550° to less than 1000°C. for time sufficient to cause the sodium and potassium compounds to react with the other ingredients so as to leave no discrete $Na_2O$ and $K_2O$ phase identifiable therein as such, to render the resultant batch chemically homogeneous, and to drive off volatiles so as to render the resultant batch capable of exhibiting not more than 2% weight loss upon further heating at 900°C. for one hour.

3,964,917

## OBJECTS OF MARBLE-LIKE GLASS CERAMIC

Shigeji Nakamura, Otsu, Japan, assignor to Nippon Electric Glass Company, Limited, Tokyo, Japan

Continuation-in-part of Ser. No. 312,631, Dec. 6, 1972, abandoned. This application Jan. 2, 1975, Ser. No. 539,160
Claims priority, application Japan, Dec. 10, 1971, 46-99500
Int. Cl.² C03C 3/22
U.S. Cl. 106—39.6 17 Claims

1. A pseudo-marble body essentially consisting of a composition consisting essentially of 56.6% to 63.9% $SiO_2$, 5.3% to 8.9% $Al_2O_3$, 18.3% to 21.8% CaO, 5.1% to 9.9% ZnO, 0% to 8.2% BaO, 0% to 2.2% $B_2O_3$, and 0% to 5.2% $Na_2 + K_2O$, the total amount of $SiO_2$, $Al_2O_3$ and CaO being within the range of 81.4% and 89.1%, all percentages being by weight, the composition constituting elongated crystals of $\beta$-wollastonite and a matrix, and the crystals being embedded in the matrix.

3,964,918

## BARIUM BOROSILICATE OPTICAL GLASSES

George B. Hares, and David W. Morgan, both of Corning, N.Y., assignors to Corning Glass Works, Corning, N.Y.

Continuation-in-part of Ser. No. 444,711, Feb. 22, 1974, abandoned. This application Dec. 6, 1974, Ser. No. 530,228
Int. Cl.² C03C 3/00
U.S. Cl. 106—47 Q 6 Claims

1. A lanthana-baria-borosilicate optical glass having a refractive index greater than 1.64, a dispersive index of at least 53, a weight loss not exceeding 1 mg./cm.² when immersed in a 10% HCl solution at room temperature for ten minutes, and being composed essentially of, as calculated from the batch in weight percent on an oxide basis, 18–36% $SiO_2$, 8–22% $B_2O_3$, 25–48% BaO, 0–10% of the other divalent metal oxides ZnO, PbO, and/or CaO, the total divalent metal oxide (RO) content being 25–48%, and 10–30% $La_2O_3$, the mole ratio of RO:$SiO_2$ not exceeding 0.6.

3,964,919

## GLASS COMPOSITIONS

Neil Hunter Ray; William Derek Robinson, and Cyril John Lewis, all of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 329,167, Feb. 2, 1973. This application July 29, 1975, Ser. No. 599,999
Claims priority, application United Kingdom, Feb. 14, 1972, 6694/72
Int. Cl.² C03C 3/16, 3/12
U.S. Cl. 106—47 R 18 Claims

1. Inorganic oxide glasses having compositions consisting essentially of ingredients within the range (in mole percent):

a. $P_2O_5$, 50–75%;
b. Group VIb oxides 0.1–10%, comprising singly or in combination $CrO_3$ up to 2.6%, $MoO_3$ up to 7%, $WO_3$ up to 7%;
c. at least one oxide selected from the group consisting of alkali metal oxides, alkaline earth oxides 15–49.9%; and
d. lead oxide,

the total of all the above ingredients being at least 98 moles percent of the total composition with no more than 2% of other oxides, excluding water.

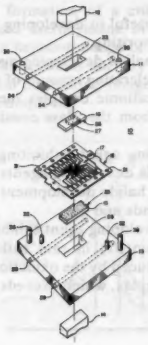
3,964,920

## SOLDER GLASS COMPOSITION AND METHOD OF USING SAME FOR ENCAPSULATING DEVICES

Earl K. Davis, Tempe; Kent W. Hansen, and Duane C. Silvis, both of Scottsdale, all of Ariz., assignors to Motorola, Inc., Chicago, Ill.

Filed Oct. 26, 1973, Ser. No. 409,843
Int. Cl.² C03C 3/04, 3/10
U.S. Cl. 106—53 6 Claims

1. A non-devitrifying solder glass composition consisting essentially of about 50–62 percent by volume of sealing glass and about 50–38 percent by volume of $ZrSiO_4$, said sealing glass consisting essentially of by weight: $SiO_2$ about 0–2 percent, PbO about 65–72 percent, ZnO about 5–10 percent, $PbF_2$ about 2–10 percent, CdO about 1–5 percent, $TiO_2$ about 0.5–3 percent and $B_2O_3$ about 10–14 percent.



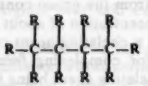
3,964,921

## WELL CEMENTING COMPOSITION HAVING IMPROVED FLOW PROPERTIES, CONTAINING PHOSPHONOBUTANE TRICARBOXYLIC ACID, AND METHOD OF USE

Leonard J. Persinski, Pittsburgh; Fred David Martin, McMurray, and Sally Lee Adams, Pittsburgh, all of Pa., assignors to Calgon Corporation, Pittsburgh, Pa.

Filed Feb. 27, 1975, Ser. No. 553,775
Int. Cl.² C04B 7/02, 7/35; E21B 33/13
U.S. Cl. 106—90 15 Claims

1. A cementing composition comprising hydraulic cement in admixture with from about 0.01 to about 5.0 percent by weight, based on weight of hydraulic cement, of a phosphonobutane tricarboxylic acid additive of the following formula:



wherein R is independently selected from -H,

and

provided that three R groups are

and one R group is

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3,964,922

## PROCESS FOR CALCINATION OF CEMENT-CLINKER

Toyomi Nishida; Hiroshi Sohma, and Hayami Ito, all of Hyogo, Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

Division of Ser. No. 394,017, Sept. 4, 1973, Pat. No. 3,881,862. This application May 22, 1974, Ser. No. 472,326
Claims priority, application Japan, Sept. 4, 1972, 47-88536
Int. Cl.² C04B 7/44
U.S. Cl. 106—100 4 Claims

1. A process for calcining cement clinkers wherein a calcining furnace is provided between a preheating apparatus for suspension type raw material and a rotary kiln or a fluidizing calcination apparatus and the raw material is preheated in said preheating apparatus and then calcined in said calcining furnace, which comprises the steps of:

a. introducing the preheated raw material particles into the calcining furnace;

b. producing a combustion gas, in a combustion chamber having a separate heat source independent of the calcining apparatus, at a temperature above that required for calcining the most or the whole part of said preheated particles;

c. introducing the combustion gas into the bottom of the calcining furnace in the form of high velocity flow at high temperature rising from the bottom of said calcining furnace, causing said combustion gas flow to rapidly expand to form a high velocity and high temperature flow in the center of said calcining furnace and a lower velocity flow of relatively lower temperature due to heat exchange with said preheated particles at the inner periphery of the surrounding wall, and introducing them into the upper part of said calcining furnace thereby reducing the velocity of the high velocity gas flow to cause the preheated particles riding on the high velocity and high temperature flow to rise from the bottom of said furnace to the upper part of said furnace while heating said raw materials to cause calcination, and classifying and separating them into lighter calcined particles and non-calcined heavier particles in the upper part of said furnace;

d. exhausting the calcined lighter particles together with gas from the upper part of said furnace while causing the non-calcined heavier particles to fall down in the lower velocity flow along the inner surface of the surrounding wall of the furnace to the bottom of said furnace whereby the high velocity flow is established to produce the circulation of the non-calcined particles in said furnace for a sufficient time required for their calcination;

e. separating the calcined particles from the gas; and

f. passing the calcined cement particles into a calcination apparatus to form cement clinkers.

3,964,923

## CONTROLLING PERMEABILITY IN SUBTERRANEAN FORMATIONS

Norris D. Zetmeir, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jan. 13, 1975, Ser. No. 540,569
Int. Cl.² C08L 1/28, 33/26
U.S. Cl. 106—189 7 Claims

1. A nonaqueous fluid composition, which, on admixing with water forms a water-impermeable gel, consisting of:

a. at least one water-soluble or at least water-dispersible polymeric material selected from the group consisting of polyacrylamides, cellulose ethers and polysaccharides;

b. an oxidizing agent selected from the group consisting of water-soluble compounds of polyvalent metals wherein the metal is present in its highest valence state, is capable of being reduced to a lower polyvalent valence state and is in a form normally unavailable for reaction until contacted with a reducing agent;

c. a reducing agent effective to reduce the higher valence metal in said oxidizing agent (b) to a lower polyvalent valence state; and

d. at least one monohydric aliphatic alcohol having from 1 to 4 carbon atoms in amounts of each component identified as (a) to (d) as follows: from 0.0025 to 20 parts of component (a) per 100 parts of component (d); an amount of component (b) at least sufficient to yield $3 \times 10^{-6}$ gram-atoms of said metal (b) per gram of polymeric material (a); and an amount of component (c) at least sufficient to reduce said metal of said component (b) to a lower polyvalent valence state.

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3,964,924

## PROTECTIVE COATING FOR GRAPHITE ELECTRODES

Ronald Kurzeja, Iselin, N.J., assignor to Pfizer Inc., New York, N.Y.

Filed July 11, 1975, Ser. No. 596,021
Int. Cl.² C09D 1/00
U.S. Cl. 106—286 4 Claims

1. A coating composition for the protection of graphite electrodes comprising a water dispersion, expressed in weight percent based on total solids, of from about 35 to 65 percent oxide-coated particulate silicon, from about 15 to 40 percent colloidal silica, from about 2 to 10 percent powdered carbon and from about 5 to 20 percent ground glass, the oxide coating of said coated silicon constituting from about 10 to 60 weight percent of said coated silicon and said glass having a softening point of from about 650° to 750°C.

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3,964,925

## APPARATUS FOR TREATING FLOOR COVERINGS

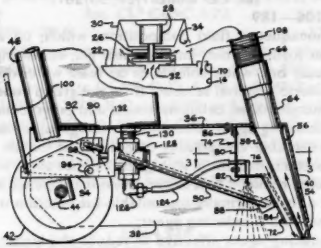
Jack L. Burgoon, Toledo, Ohio, assignor to The Scott & Fetzer Company, Lakewood, Ohio

Continuation-in-part of Ser. No. 465,233, April 29, 1974, abandoned. This application July 1, 1974, Ser. No. 484,804
Int. Cl.² B08B 5/04
U.S. Cl. 134—21 32 Claims

1. Apparatus for cleaning a floor covering or the like, said apparatus comprising means forming a vacuum nozzle, means forming an exhaust air opening near said vacuum nozzle, means for supporting said nozzle means and said opening means over the floor covering for movement thereover, a remote vacuum tank, a vacuum blower remote from said nozzle means, said opening means and said supporting means and communicating with said tank for establishing a vacuum in said tank, a housing around said vacuum blower and having an exhaust outlet, first flexible passage means connecting said vacuum nozzle and said tank to establish a continuous flow of air through said nozzle to said tank whenever said blower is operating, second flexible passage means connecting said exhaust air opening and said exhaust outlet, and a liquid nozzle positioned at said exhaust air opening for directing liquid toward the floor covering with the exhaust air passing through

said exhaust air opening being effective to break up the liquid from said liquid nozzle.

12. Apparatus according to claim 1 characterized by said supporting means comprising a platform, a liquid container



for containing liquid at ambient pressure, means for supplying liquid from said container to said liquid nozzle, and means for removably supporting said liquid container above said liquid nozzle on said platform.

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3,964,926

## CLEANSING RECEPTACLE FOR CAPILLARY WRITING PEN PARTS

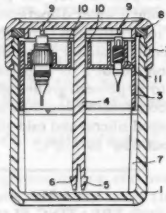
Werner Westphal, Pinneberg, Germany, assignor to Koh-I-Noor Rapidograph, Inc., Bloomsbury, N.J.

Filed Apr. 2, 1975, Ser. No. 564,391

Claims priority, application Germany, Apr. 27, 1974, 7414942

Int. Cl.² B08B 3/04, 11/02

U.S. Cl. 134—117 5 Claims



1. A cleansing receptacle of the type used for cleaning the several components of capillary writing pen parts, comprising:

A. a container, adapted to be partially filled with cleaning solution, having a closed end and an open end, a cover for said open end and having coupled thereto a holder adapted for reception of parts to be cleaned, wherein;

B. said cover and holder coupling comprises a pin extending axially and inwardly from said cover through a complementary axial hole within said holder, said holder being axially slidable thereupon wherein said pin at its distal end includes means to limit axial displacement, and;

C. said container further including a plurality of ribs formed axially extending from said closed end upon its inner walls operable to axially support and limit the inward displaceability of said holder inside and near the top of said container when said cover and holder assembly has been fitted to said container, thereby completely enclosing said holder by said cover and said container and further maintaining said pen parts above said cleaning solution when said assembly is in an upright position.

3,964,927

## LEAD DIOXIDE-ZINC RECHARGEABLE-TYPE CELL AND BATTERY AND ELECTROLYTE THEREFOR

Enrique Villarreal-Dominguez, Edificio 28-Depto, 302, Villa Olimpica, Mexico City 22, Mexico

Filed Oct. 10, 1974, Ser. No. 513,558

Int. Cl.² H01M 4/36

U.S. Cl. 136—26 4 Claims

1. A storage battery comprising a plurality of lead dioxide-zinc rechargeable-type cells connected in series, each cell comprising a positive lead dioxide plate, a negative amalgamated zinc metal plate spaced from said positive plate and parallely confronted thereto, with both plates being permanently submerged in an acid electrolyte comprising an aqueous solution of zinc sulfate, sodium sulfate, aluminum sulfate, mercuric sulfate, sulfuric acid, dextrin and dibutylamine.

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3,964,928

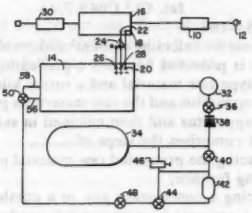
## LEAD-OXYGEN DC POWER SUPPLY SYSTEM HAVING A CLOSED LOOP OXYGEN AND WATER SYSTEM

William J. Britz, Huntsville; William A. Boshers, Madison, and James J. Kaufmann, Huntsville, all of Ala.

Filed Dec. 27, 1974, Ser. No. 537,024

Int. Cl.² H01M 8/04, 8/18

U.S. Cl. 136—86 A 2 Claims



1. A closed-loop electrical power supply system for supplying power to electrical equipment comprising:

a. at least one lead-oxygen battery cell having a pair of positive terminals and a negative terminal;

b. charging means supplying DC power for charging said battery cell;

c. pump means connected to said battery cell for evacuating oxygen released from said battery cell during the charging thereof;

d. storage means connected to said pump means for receiving said oxygen in such a manner as to store said oxygen;

e. condensor means connected between said pump means and said storage means for cooling said oxygen causing moisture contained therein to condense into water;

f. accumulator means for receiving and storing said water; and

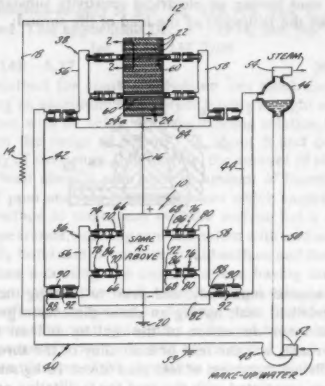
g. valve and valve control means for causing said water to be conveyed and returned to said battery cell following the charging thereof and for permitting oxygen from said storage means to be delivered and returned to said battery cell during the discharging of said battery cell;

whereby a closed-loop, self-contained battery system is provided reclaiming and re-using gases given off during the operation thereof thus eliminating pollutive and dangerous fumes while enhancing the efficiency of the system.

## 3,964,929
## FUEL CELL COOLING SYSTEM WITH SHUNT CURRENT PROTECTION

**Paul E. Grevstad, West Hartford, Conn., assignor to United Technologies Corporation, Hartford, Conn.**

**Filed July 21, 1975, Ser. No. 597,612**
**Int. Cl.² H01M 8/04**
**U.S. Cl. 136—86 R** **7 Claims**




1. A fuel cell power plant cooling system comprising:
a non-dielectric coolant;
a load;
electrical connection means;
a plurality of fuel cell stacks each having a low potential end and a high potential end, said stacks connected electrically in series to each other via said electrical connection means and connected electrically in series with said load, said series of stacks being connected electrically to ground, each stack comprising a plurality of cells connected electrically in series and electrically conductive separator plate means disposed between each pair of adjacent cells in each stack, at least one of said separator plate means in each stack including passageways formed therein, each of said stacks including a cooler, said coolant flowing through said cooler, said cooler including cooler tubes said tubes disposed within said passageways and passing through said plate means, said tubes comprising electrically conductive wall means, said cooler also including an electrically conductive plenum in fluid communication with said tubes;
coolant circulation means connected electrically to ground and in fluid communication with each of said plenums, said coolant circulation means including dielectric first conduit means connected to said plenums for providing fluid communication between said circulation means and said plenums and adapted to create first high electrical resistance paths in said coolant; and
electrical communication means connected between said plenum of at least one of said cooler and one of said ends of said stack associated with said plenum.

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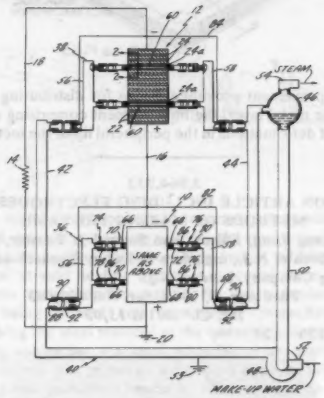
## 3,964,930
## FUEL CELL COOLING SYSTEM

**Carl A. Reiser, Glastonbury, Conn., assignor to United Technologies Corporation, Hartford, Conn.**

**Filed July 21, 1975, Ser. No. 597,614**
**Int. Cl.² H01M 8/04**
**U.S. Cl. 136—86 R** **9 Claims**

1. In a fuel cell stack comprising a plurality of cells connected electrically in series and electrically conductive separator plate means disposed between each pair of adjacent cells, said plate means including a pair of opposed surfaces, one facing each cell, each of said cells comprising an anode electrode and a cathode electrode spaced apart and including a matrix disposed therebetween adapted to hold electrolyte, said surfaces having channels formed therein in gas communication with said electrodes for carrying reactant gases into communication with said electrodes, an improvement to said stack comprising:




at least one of said opposed surfaces of at least one of said separator plate means in said stack including passageways formed therein parallel to the plane of said surface; and
cooler means for carrying a coolant into heat exchange relationship with said cells and including a plurality of cooler tubes disposed in said passageways and passing through said plate means.

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## 3,964,931
## CATHODE FOR ALKALINE PRIMARY BATTERIES

**Helmut Balters, Abtsgmund, and Gerhard Schneider, Ellwangen, both of Germany, assignors to VARTA GmbH, Ellwangen, Germany**

**Division of Ser. No. 203,058, Nov. 29, 1971, abandoned. This application Oct. 31, 1973, Ser. No. 411,279**
**Claims priority, application Germany, Nov. 30, 1970, 2058768**
**Int. Cl.³ H01M 21/00**
**U.S. Cl. 136—107** **6 Claims**

1. In a cell having a positive electrode, a negative electrode and an electrolyte, said cell being for use with a multi-cell battery, said positive electrode consisting essentially of mercury oxide and means for providing an indication of the state of discharge of said cell consisting of silver (I) oxide, said silver (I) oxide being from 2 to 10% by weight of the positive electrode mass.

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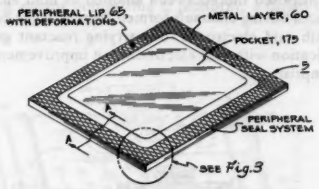
## 3,964,932
## BATTERY HAVING DEFORMATIONS IN A METAL LAYER

**John E. Oltman, Mount Horeb, and Ralph H. Feldhake, Verona, both of Wis., assignors to ESB Incorporated, Philadelphia, Pa.**

**Continuation-in-part of Ser. No. 326,697, Jan. 26, 1973, abandoned. This application Aug. 14, 1975, Ser. No. 604,716**
**Int. Cl.³ H01M 1/00**
**U.S. Cl. 136—111** **7 Claims**

1. An improvement in a battery having a metal layer as a component thereof, the metal layer having a peripheral lip which is adhesively heat sealed to at least one other compo-

nent of the battery around the periphery of the battery and as part of a peripheral sealing system for the battery,




the improvement providing means for distributing stresses in the metal layer, the improvement comprising a plurality of deformations in the peripheral lip of the metal layer.

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**3,964,933**

## CARBON ARTICLE INCLUDING ELECTRODES AND METHODS OF MAKING THE SAME

**Shun Chong Fung, Edison, and Samuel J. Tauster, Englishtown, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.**

**Filed Apr. 8, 1974, Ser. No. 458,543**
**Int. Cl.² H01M *13/02***
**U.S. Cl. 136—121** **4 Claims**

**1.** An electrically conducting carbon composition comprising a non-conductive oxide which has a deposit of from about 2 wt. % to about 12 wt. % of carbon on the surface thereof, said oxide being one which forms nonstoichiometric compounds upon reduction, and the morphology of the deposited carbon being substantially identical to that of the oxide when observed by electron micrograph.

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**3,964,934**

## HIGH DISCHARGE CAPABILITY SEALED THROUGH CONNECTOR

**Larry K. W. Ching, Jr., Littleton, and Charles E. Coleman, Lakewood, both of Colo., assignors to The Gates Rubber Company, Denver, Colo.**

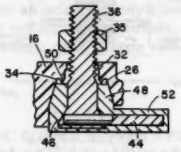
**Filed May 15, 1975, Ser. No. 577,813**
**Int. Cl.² H01M *2/30***
**U.S. Cl. 136—135 R** **23 Claims**

**1.** A sealed through connector for conducting electrical current from an electrolytic device through a substantially electrically nonconductive resilient partition, comprising:

at least one connector seat having a through bore and contained within said resilient partition, the seat comprising a shoulder portion interposed between a reduced neck portion and an inclined ramp portion;

a connector post insert positioned within the seat and extending through the bore, the insert comprising a stud of electrically conductive material and a deformable lead or lead alloy shroud having an inclined surface portion for disposition within the seat, at least the portion of the stud disposed substantially opposite the ramp portion of the seat being encased by the lead shroud;

said stud having an electrical resistivity substantially less than the resistivity of the lead of the shroud;




said shroud separately, and prior to forming the hereafter described seal, having an outer dimension greater than the inner dimension of the seat by at least about one percent, and the lead or lead alloy of the shroud having a Brinell hardness of less than about 10 kg/mm²;

means associated with the stud for facilitating pressing the inclined surface portion of the shroud against the inclined ramp portion of the seat to form an interference fit therebetween and thereby establish a liquid-tight seal between the connector and resilient partition.

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**3,964,935**

## ALUMINUM-CERIUM-IRON ELECTRICAL CONDUCTOR AND METHOD FOR MAKING SAME

**Van C. Wilks, Carrollton, Ga., assignor to Southwire Company, Carrollton, Ga.**

**Continuation-in-part of Ser. No. 240,794, April 3, 1972, abandoned. This application Oct. 7, 1974, Ser. No. 512,821**
**Int. Cl.² C22F *1/04***
**U.S. Cl. 148—2** **10 Claims**

**1.** An aluminum alloy electrical conductor manufactured in the form of an at least partially annealed wire by means of continuous casting and rolling, drawing without preliminary or intermediate anneals, and then at least partially annealing the wire, said wire having a minimum conductivity of 61% IACS in the final at least partially annealed condition and consisting essentially of from about 0.55 to about 1.2 weight percent iron, from about 0.2 to about 1.5 weight percent cerium, optionally up to about 0.15 weight percent each of cobalt and magnesium in a total amount not exceeding about 0.25 weight percent, and the remainder aluminum with associated trace elements, the combined amounts of cerium and iron ranging from at least about 1.2 percent to about 2.5 percent; said wire having dispersed therein intermetallic precipitates comprising cerium aluminate and iron aluminate to further improve the physical properties of said conductor.

**10.** A method of preparing the aluminum alloy electrical conductor according to claim 1, comprising the steps of:

A. alloying said named constituents;

B. continuously casting the alloy in a moving mold formed between a groove in the periphery of a rotating casting wheel and a metal belt laying adjacent said groove for a portion of its length;

C. hot-rolling the cast alloy substantially immediately after casting while the cast alloy is in substantially that condition as cast to form a continuous rod;

D. drawing the rod through a series of wire-drawing dies, without any preliminary or intermediate anneals, to form wire; and

E. thereafter annealing or partially annealing the wire to achieve a conductivity of at least 61% IACS.

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3,964,936

## COATING SOLUTION FOR METAL SURFACES

Narayan Das, Westmont, Ill., assignor to Amchem Products, Inc., Ambler, Pa.

Continuation-in-part of Ser. No. 429,779, Jan. 2, 1974, abandoned. This application Dec. 17, 1974, Ser. No. 533,644

Int. Cl.² C23F 7/06

U.S. Cl. 148—6.27 30 Claims

8. A method for coating aluminum can stock comprising contacting an aluminum can surface having a bright and shiny appearance with an acidic aqueous coating solution having a pH within the range of about 3 to about 5 and consisting essentially of zirconium and fluoride, the amount of zirconium being at least about 3 ppm and the amount of fluoride being at least 5 ppm and less than an amount which causes etching of said surface to the extent that the surface has a dull and frosty appearance, reacting said zirconium with said surface to chemically bond said zirconium to said surface and forming on said surface a coating, the coated surface having said bright and shiny appearance and resisting blackening after the coated surface is subjected to boiling water for 15 minutes, and wherein said coating solution is free of hexavalent chromium, ferroand ferricyanide, and any material which contains a transition element of the chromium subgroup of the Periodic Table.

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3,964,937

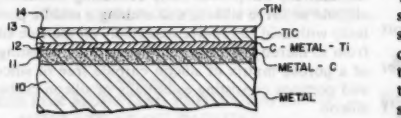
## METHOD OF MAKING A COMPOSITE COATING

Robert C. Post, Dallas; Allen W. McCullough, Irving , and James H. McClure, Dallas, all of Tex., assignors to Materials Technology Corporation, Dallas, Tex.

Division of Ser. No. 387,665, Aug. 13, 1973, Pat. No. 3,874,900. This application Dec. 20, 1974, Ser. No. 534,698

Int. Cl.² C23C 11/08

U.S. Cl. 148—6.35 4 Claims




1. The method of forming a coating on the wear surface of a composite metal tool comprising the steps of:

a. carburizing the wear surface of said tool by depositing carbon thereon in amounts sufficient to form a surface layer enriched in carbon;

b. reacting a titanium halide with a volatile hydrocarbon to form an interlayer at the surface of said tool, said interlayer comprising titanium, carbon and the material of said tool;

c. depositing a coating of titanium carbide on said interlayer by reacting a volatile hydrocarbon and a titanium halide in hydrogen at the surface of said interlayer; and

d. depositing a coating of titanium nitride on said coating of titanium carbide by reacting nitrogen and a titanium halide in hydrogen at the surface of said titanium carbide.

3,964,938

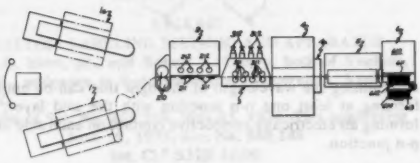
## METHOD AND APPARATUS FOR FORMING HIGH TENSILE STEEL FROM LOW AND MEDIUM CARBON STEEL

Wilbur E. Tolliver, Holland, and Daniel J. Borodin, Detroit, both of Mich., assignors to New York Wire Mills Corporation, Tonowanda, N.Y.

Filed Jan. 20, 1975, Ser. No. 542,341

Int. Cl.² C21D 9/52, 11/00

U.S. Cl. 148—12 B 75 Claims



1. A method for substantially increasing the tensile strength of steel material comprising: moving the steel material relative to adjacent heating and quenching means; heating the steel material at said heating means to a temperature above the austenite conversion temperature for the particular steel material being treated and immediately thereafter rapidly quenching the steel material at the quenching means; simultaneously subjecting the steel material to an external force between two spaced points located on opposite sides of said heating and quenching means to effect elongation and cross section reduction in the steel material between said two spaced points.

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3,964,939

## BODIES INCLUDING PASSIVATED METAL PARTICLES

Edwin Arthur Chandross; Murray Robbins, both of Berkeley Heights, and Harold Schonhorn, New Providence, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 26, 1974, Ser. No. 536,377

Int. Cl.² H01F 1/02

U.S. Cl. 148—105 4 Claims

1. A body including particulate matter, which particulate matter consists essentially of essentially oxide free particles of an oxidizable metal, whose average least dimension is less than 100 micrometers, in intimate contact with an organic substance wherein the organic substance is at least one molecular species present on the surface of the particles in sufficient quantity to provide a surface layer at least one monolayer thick on each particle but constitutes less than five percent of the weight of the matter, wherein the at least one molecular species is selected from the group consisting of a urea, a thiourea, an isocyanate and an isothiocyanate which molecular species contains at least one organic substituent, which substituent contains at least two carbons.

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3,964,940

## METHODS OF PRODUCING GALLIUM PHOSPHIDE YELLOW LIGHT EMITTING DIODES

Peter Brian Hart, and Ralph Nicklin, both of Northampton, England, assignors to Plessey Handel und Investments A.G., London, England

Continuation-in-part of Ser. No. 287,175, Sept. 7, 1972, abandoned. This application June 27, 1974, Ser. No. 483,810

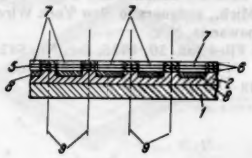
Claims priority, application United Kingdom, Sept. 10, 1971, 42291/71

Int. Cl.² H01L 21/205, 33/00

U.S. Cl. 148—175 12 Claims

1. A method of producing a gallium phosphide yellow light emitting diode which includes the steps of providing a single crystal gallium phosphide substrate; growing from a hydride vapour phase a single crystal layer of nitrogen doped gallium

phosphide of the same conductivity type as the substrate on a surface of the substrate such that the nitrogen content of the layer is greater than $10^{19}$ atoms/cc, the actual nitrogen content



determining the wavelength of the light that can be emitted; forming at least one p-n junction with the said layer; and forming an electrically conductive contact on each side of the p-n junction.

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**3,964,941**

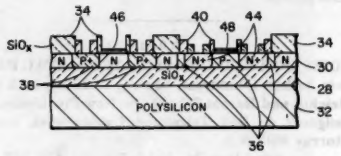
## METHOD OF MAKING ISOLATED COMPLEMENTARY MONOLITHIC INSULATED GATE FIELD EFFECT TRANSISTORS

**Raymond C. Wang, Tempe, Ariz., assignor to Motorola, Inc., Chicago, Ill.**

**Continuation of Ser. No. 154,922, June 21, 1971, abandoned. This application May 7, 1973, Ser. No. 358,190**

**Int. Cl.² H01L 7/36, 7/64**

**U.S. Cl. 148—187** **7 Claims**




**1.** A method of making a complementary insulated gate field effect transistor integrated circuit by including the steps of:

forming on a surface of a semiconductor layer of a first conductivity type a dielectric layer;

forming on said dielectric layer a polycrystalline support layer;

forming on an exposed surface of said semiconductor layer a first insulating layer having a first aperture therein;

forming a lightly doped tub region of a second conductivity type through said first aperture and a second insulating layer thereon, said tub region extending through said semiconductor layer to said dielectric layer;

forming first source and drain regions defining a channel of a first field effect transistor in said lightly doped tub region and second source and drain regions defining a channel of a second field effect transistor in said semiconductor layer, said source and drain regions extending to the exposed surface of said semiconductor layer and lightly doped tub region; and

forming first and second gate electrodes spaced by a gate insulation layer on the exposed surface of said lightly doped tub region and semiconductor layer from the channels of said first and second field effect transistors, respectively.

**7.** The method of claim 1 in which said lightly doped tub region is formed by diffusing a P-type impurity in said semiconductor layer through the exposed surface, driving in the diffused impurity, and removing a portion of said semiconductor layer from the exposed surface to reduce the thickness of said semiconductor layer.

**3,964,942**

## CHEMICAL POLISHING OF SINGLE CRYSTAL DIELECTRICS

**Melvin Berkenblit, and Arnold Reisman, both of Yorktown Heights, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Oct. 16, 1970, Ser. No. 81,610**

**Int. Cl.² C23G 1/36**

**U.S. Cl. 156—2** **8 Claims**

**1.** A method for polishing single crystals of sapphire and magnesium spinel comprising the steps of:

immersing a single crystal substrate selected from the group consisting of sapphire and magnesium spinel in a mixture of sulphuric acid and phosphoric acid in a range of mixtures of 9 parts sulphuric acid to 1 part phosphoric acid to 1 part sulphuric acid to 9 parts phosphoric acid by volume said mixture being held at a temperature in the range of 200°–325°C, said magnesium spinel single crystal having one of the orientations (100 ) and (110) and said sapphire single crystal having one of the orientations (0001), (11$\bar{2}$3), (1$\bar{1}$00), (11$\bar{2}$4), (11$\bar{2}$0) and (01$\bar{1}$2) for a time sufficient to achieve polishing of said substrate.

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**3,964,943**

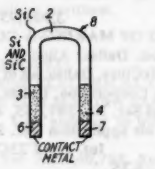
## METHOD OF PRODUCING ELECTRICAL RESISTOR

**Niels Lervad Andersen, Nordborg, Denmark, assignor to Danfoss A/S, Nordborg, Denmark**

**Division of Ser. No. 442,485, Feb. 12, 1974. This application Nov. 29, 1974, Ser. No. 528,076**

**Int. Cl.² H05B 3/66**

**U.S. Cl. 156—6** **5 Claims**




**1.** A method of producing a silicon carbide electrical resistor which comprises forming under pressure a dense and substantially nonporous body consisting essentially of silicon carbide and free silicon, and etching a middle portion of said body with acid to remove essentially all the free silicon therefrom to thereby obtain a middle portion consisting essentially of a porous matrix of silicon carbide free of silicon and two end portions consisting essentially of silicon carbide and free silicon.

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**3,964,944**

## MANUFACTURE OF CEMENTITIOUS BOARD

**Thomas Gwynne, Loughborough, England, assignor to United States Gypsum Company, Chicago, Ill.**

**Filed Nov. 6, 1973, Ser. No. 413,289**

**Int. Cl.² B32B 1/04, 31/18**

**U.S. Cl. 156—40** **3 Claims**

**1.** A method for the manufacture of a planar lined board of cementitious material including the steps of:

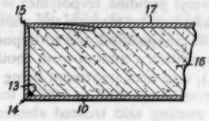
scoring a lower lining sheet at its edge regions along lines where folds are to be made;

advancing said lower sheet in a generally horizontal plane;

applying substantially solely to said edge regions of said lower sheet in the parts thereof to be folded at least one line or band of quick-setting adhesive;

folding the edges of said advancing sheet to provide at least part of the final edge configuration of the board and maintaining said regions in said configuration until fixed therein by setting of said adhesive;

depositing an aqueous slurry of cementitious material on said advancing sheet;




covering said slurry with an advancing upper lining sheet; and forming the resulting board to required cross-sectional dimensions.

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**3,964,945**

**METHOD OF MAKING AN ELECTRICAL CABLE**

**William Duke Everhart, Florence, S.C., and Charles Raymond McKay, Severna Park, Md., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation of Ser. No. 241,907, April 7, 1972, abandoned, which is a division of Ser. No. 34,812, May 5, 1970, abandoned. This application May 9, 1974, Ser. No. 468,537**

**Int. Cl.² H01B 7/18, 13/26**

**U.S. Cl. 156—52** **2 Claims**

1. A method of making an electrical cable having a core and a shield including the steps of:

forming a corrugated protective member by corrugating at least two polyethylene terephthalate films together under heat and pressure whereby such films are laminated together and wherein the combined thickness of the films, prior to corrugating, is less than 5 mils;

positioning such protective member between the core and the shield, with such protective member completely surrounding the periphery of such core, and

applying an outer jacket in a molten state over the shield, such core being effectively insulated from heat thereof by the protective member during such application and wherein the protective member has a percent fall-out of less than 35% when heated for 5 minutes at 150°C. and wherein the height of the protective member, in the finished cable and after the outer jacket has been applied, as measured from corrugation crest to corrugation crest, is at least 8 mils.

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**3,964,946**

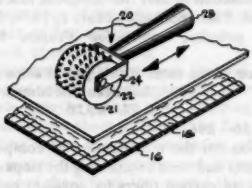
**PROCESS FOR MOUNTING PHOTOGRAPHS TO SIMULATE AN OIL PAINTING**

**Eugene H. Falk, P.O. Box 1188, Monterey, Calif. 93940**

**Filed Jan. 31, 1975, Ser. No. 546,038**

**Int. Cl.² B44C 3/02**

**U.S. Cl. 156—59** **9 Claims**




1. A process for mounting a photograph or other printed image to simulate an oil painting comprising the steps of:

providing a textured surface having small voids therein;

fixing the photograph face up to the textured surface by spreading glue on one or both the photograph or the surface and pressing the photograph onto the surface;

rolling the photograph with a resilient roller having resilient projections thereon of a diameter sufficiently small to at least partially fit within the textured surface voids and press the adjacent portions of the photograph therein; and

applying a transparent sealing material over the photograph which dries to form a seal for the photograph.

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**3,964,947**

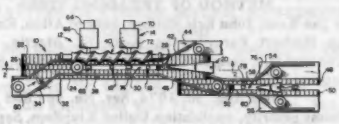
**BOTTOM LABELING METHOD AND APPARATUS**

**Paul R. Mort, Jr., and Robert A. Cleary, both of Yonkers, N.Y., assignors to Synchro-Motion Corporation, Yonkers, N.Y.**

**Division of Ser. No. 469,549, May 13, 1974. This application June 19, 1975, Ser. No. 588,148**

**Int. Cl.² B32B 31/00**

**U.S. Cl. 156—64** **2 Claims**



1. A method of bottom labeling a product comprising the steps of:

feeding a product past a first labeling station which is adapted to apply a label to the bottom of the product;

scanning the product to determine if a label has been applied to the bottom at the first labeling station;

feeding the product past a second labeling station which is adapted to apply a label to the bottom of the product;

applying a label to the product bottom at the second labeling station if the scanning determined no label was applied in the first labeling station;

scanning the product a second time to determine if a label has been applied to the bottom thereof; and

diverting the product from the feeding path of such product if the second scanning step determines that no label has been applied to the bottom of the product.

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**3,964,948**

**METHOD FOR DOSING A LOCKING AGENT INTO A THREADED HOLE**

**Walter Busse, Neubiberg, Germany, assignor to Maschinenfabrik Augsburg-Nurnberg AG, Munich, Germany**

**Filed Nov. 25, 1974, Ser. No. 526,761**

**Claims priority, application Germany, Dec. 1, 1973, 2359937**

**Int. Cl.² B32B 7/04**

**U.S. Cl. 156—91** **1 Claim**

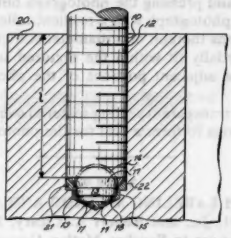
1. A method of introducing a dose of a liquid or semi-liquid locking agent into the helical space between the threads of a screw and a threaded blind hole accommodating the screw, comprising the steps of:

a. providing a capsule of compact shape comprising the locking agent completely enclosed in a hollow wall,

b. inserting the capsule into the bottom of the blind hole with the major portion of the capsule volume beneath the lowest point of engagement of the screw and hole threads after the screw has been threaded all the way into the blind hole, and

c. threading the screw into the hole so that the screw crushes the capsule against the bottom of the hole and releases the locking agent into the helical space between the screw and hole wall during the final portion of the

movement of the screw into the hole, the crushed capsule wall material approximately filling the space between the



inner end of the screw and the bottom of the hole after the screw has been threaded all the way into the hole.

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3,964,949

## METHOD OF TREADING TIRES

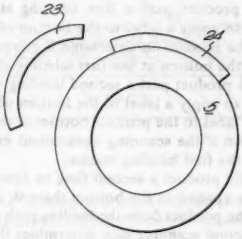
**Peter Jan Kent; John Eric Phillips, both of Alton, England, and Jan Herbert Farquharson Kent, St. Martin, Guernsey (Channel Is.), assignors to Kentredder Limited, St. Saviour, Guernsey (Channel Is.)**

**Filed Aug. 30, 1974, Ser. No. 501,858**

**Claims priority, application United Kingdom, Sept. 7, 1973, 42208/73**

**Int. Cl.² B29H** *5/04, 17/36, 17/37*

**U.S. Cl. 156—96** **22 Claims**



**1.** A method of applying a tread to a tire carcass comprising the steps of providing a prevulcanized tread in strip form, placing the tread on the carcass with at least the wearing surface of the tread in a direction parallel to the longitudinal axis of the strip being shortened with there being a compressive stress in the tread longitudinally axially of the strip, and then bonding the compressed tread to the relatively uncompressed carcass while maintaining the compressive stress in the tread with the compressive stress remaining in the tread after it is bonded to the carcass so that the wearing surface of the final assembly remains under compressive stress.

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3,964,950

## ADHESION/BONDING DIP FOR TIRE REINFORCEMENT FABRICS

**Hubert J. Boles, Cuyahoga Falls, Ohio, assignor to The General Tire & Rubber Company, Akron, Ohio**

**Filed Dec. 9, 1974, Ser. No. 531,111**

**Int. Cl.² B29H** *5/02*

**U.S. Cl. 156—110 A** **13 Claims**

**1.** A method for adhering a polyester reinforcing element to a vulcanized conjugated diene rubber compound which comprises treating said element with a composition comprising an aqueous alkaline dispersion of from about 10 to 30 percent by weight (as dry solids) of a mixture of about 65 to 89 parts of a rubbery vinyl pyridine terpolymer containing about 50 to 95 percent of a conjugated diolefin, about 5 to 40 percent of vinyl pyridine and about 0 to 40 percent of a styrene, about 10 to 30 parts of a resorcinol-formaldehyde resin and from about 0.5 to 5 parts of a heat reactable peroxide having a one-hour, half-life at 100°–160°C. wherein the peroxide is added to the dip after the vinyl pyridine terpolymer is polymerized; heat treating said element to remove the water and to cure the solids from said composition and to deposit on said element from said composition a total of from about 3 to 7 percent by weight (solids), said heat treatment being conducted at temperatures of from about 300° to 500°F. for from about 30 to 150 seconds, cooling said treated element, combining said cooled treatment element with an unvulcanized vulcanizable rubber consisting essentially of conjugated diene as the major elastomer component, and vulcanizing the same.

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3,964,951

## METHOD OF JOINING STIFFENING MATERIAL TO SHOE UPPER USING ULTRA HIGH FREQUENCY RADIATION

**Paul A. Kremer, Grosskrotzenburg, and Bernhard N. Gora, Grossauheim, both of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Germany**

**Filed July 2, 1974, Ser. No. 485,277**

**Claims priority, application Germany, July 16, 1973, 2336067**

**Int. Cl.² B29C** *19/02*

**U.S. Cl. 156—272** **6 Claims**

**1.** A method of joining a stiffening material consisting essentially of a thermoplastic synthetic resin stiffening agent containing homogeneously dispersed therein 3 to 50 parts per 100 parts of the synthetic resin of carbon black or graphite as an active substance to a shoe upper material of leather or synthetic resin which is devoid of such active substance without significantly heating the shoe upper material comprising heating the stiffening material to the temperature at which it becomes soft and adhesive by subjecting the stiffening material and adjacent shoe upper material to ultra high frequency radiation for about 2 to 15 seconds.

**3.** A method according to claim **1** wherein the ultra high frequency radiation is 2450 mega Hertz.

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3,964,952

## METHOD OF MANUFACTURE OF COMPOSITE MATERIALS CONSISTING OF CARBON FIBERS AND RESIN AND MATERIALS MANUFACTURED IN ACCORDANCE WITH SAID METHOD

**Michel Brié, Orsay, and Gérard Riess, Mulhouse, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France**

**Continuation of Ser. No. 235,303, March 16, 1972, abandoned. This application Mar. 1, 1974, Ser. No. 447,289**

**Claims priority, application France, Mar. 19, 1971, 71.09820**

**The portion of the term of this patent subsequent to Dec. 17, 1991, has been disclaimed.**

**Int. Cl.² B32B** *5/02*

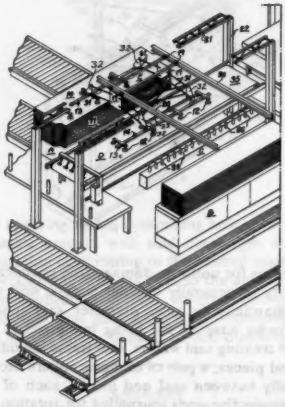
**U.S. Cl. 156—296** **21 Claims**

**1.** Process for the manufacture of composite materials of carbon fibers and resin comprising the steps of radical grafting a polymer on carbon fibers by covalent bond, obtaining the bond by creation of free radicals on the polymer by heat and transfer reaction of the radicals on the sites of the carbon fibers and then incorporating the grafted fibers in a resin compatible with the polymer.

## 3,964,953
## APPARATUS AND METHOD FOR LAMINATING LINER TO BOX BLANK

John M. Mitchard, Cherry Hill, N.J., and Peter J. Loftus, Levittown, Pa., assignors to Union Camp Corporation, Wayne, N.J.

Filed Mar. 25, 1975, Ser. No. 561,984
Int. Cl.² B31B *1/62, 1/06;* B32B *31/12;* B65H *39/04*
U.S. Cl. 156—300 4 Claims



2. Apparatus for laminating a first sheet in registry on a second sheet having at least one dimension larger than the corresponding dimension of the first sheet comprising:

a support for a stack of first sheets;

a support for a stack of second sheets;

a laminating table interposed between the said supports;

a shuttle movable in a cross-machine direction, said shuttle having means for gripping and lifting first and second sheets and being adapted to alternately take said sheets from the stacks on the supports to the laminating table and place a second sheet in registered position on the laminating table and a first sheet in registered position on the second sheet;

stops projecting upwardly from the laminating table to limit the forward and side motions of the second sheet and register it in position as it is placed on the laminating table;

stops movable into position over the second sheet to limit the forward and side motions of the first sheet and register it in position on the second sheet;

adhesive applying means to apply adhesive to the first sheet as it moves from the stack to the laminating table; and

means to convey the laminated sheets from the laminating table.

4. A method for laminating a first sheet in registry on a second sheet having at least one dimension larger than the corresponding dimension of the first sheet comprising:

providing a stack of first sheets;

providing a stack of second sheets;

interposing a laminating table between the said stacks;

positioning spaced means for gripping and lifting first and second sheets with the second sheet gripping and lifting means on the second sheet stack and the first sheet gripping and lifting means over the laminating table;

actuating the second sheet gripping and lifting means to pick up a second sheet from the second sheet stack;

moving the spaced means in a cross-machine direction and placing the second sheet against second sheet stops to register such second sheet in a forward and sideways direction on the laminating table with the first sheet gripping and lifting means positioned over the first sheet stack;

actuating the second sheet gripping and lifting means to release the said second sheet;

actuating the first sheet gripping and lifting means to pick up a first sheet from the first sheet stack;

moving first sheet stops into position over the second sheet on the laminating table to limit the forward and side motions of the first sheet to be placed on the second sheet and register such first sheet on the second sheet;

moving the spaced means in a reverse crossmachine direction, applying adhesive to the first sheet and placing the first sheet against the first sheet stops in a registered position on the second sheet on the laminating table;

moving the first sheet stops out of position from over the second sheet on the laminating table to permit the laminated first and second sheets to be moved from the laminating table; and

conveying the laminated sheets from the laminating table.

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## 3,964,954
## METHOD OF BONDING UTILIZING IMIDE ESTER DERIVATIVES OF ETHENE MALEIC ANHYDRIDE COPOLYMERS

Abraham Morduchowitz, Monsey, N.Y., assignor to Texaco Inc., New York, N.Y.

Division of Ser. No. 102,539, Dec. 29, 1970, Pat. No. 3,810,276. This application May 31, 9173, Ser. No. 365,647
Int. Cl.² C09J *5/00;* B32B *27/34, 17/10, 15/08*
U.S. Cl. 156—331 5 Claims

1. A method of adhering paper, cardboard, ceramic, glass, plastics and metals to themselves or each other which comprises applying to adjacent surfaces of said materials an imide-ester derivative of an ethene-maleic anhydride copolymer and maintaining said surfaces together whereby an adherent bond forms, said imide-ester derivative prepared by a process which comprises:

a. reacting together under refluxing conditions a 1:1 linear copolymer of ethene and maleic anhydride having an average molecular weight between about 10,000 and 25,000 dissolved in a hydrocarbon solvent and an alcohol selected from the group consisting of $C_{8\text{-}30}$ saturated aliphatic alcohols, $C_{8\text{-}30}$ unsaturated aliphatic alcohols and mixtures thereof,

b. adding to the reaction mixture of step (a) an amino compound selected from the group consisting of N-($C_{8\text{-}30}$) alkyl-1,3-diaminopropane, N-($C_{8\text{-}30}$) alkenyl-1,3-diaminopropane, $C_{8\text{-}30}$ alkylamine, $C_{8\text{-}30}$ alkenylamine and mixtures thereof and a catalyst comprising a strong organoinorganic acid,

c. reacting under refluxing conditions the mixture of step (b),

d. removing water of formation formed in step (c) from the reaction mixture, and

e. recovering from the reaction mixture, an imideester derivative of the ethene-maleic anhydride copolymer.

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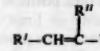
## 3,964,955
## BONDING METHOD USING OLEFIN-ACRYLIC ESTER COPOLYMER

Masaaki Hirooka; Yoshikazu Fujii; Shigeru Morita, all of Ibaragi; Isamu Namazue, Toyonaka, and Kazuhiko Hata, Takatsuki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed May 29, 1974, Ser. No. 474,177
Claims priority, application Japan, June 2, 1973, 48-62174
Int. Cl.² C09J *7/02*
U.S. Cl. 156—332 19 Claims

1. In a method for the bonding of solid materials wherein an adhesive is applied to the surface of the solid materials to be bonded before contacting said solid surfaces, the improvement said of utilizing as aid adhesive a composition comprising an interpolymer containing 5 to 60 mole percent of at least

one olefin unit having 3–20 carbon atoms, 40–95 mole percent of at least one acrylic ester unit having an alcohol residue containing 1–20 carbon atoms and 0.1 to 30 mole percent of at least one functional ethylenically unsaturated compound from among acryloyl halides, having the formula



or maleic anhydride, wherein $R^I$ and $R^{II}$ are individually a hydrogen atom, a halogen atom, a hydrocarbon or halohydrocarbon group having 1 to 8 carbon atoms, or wherein Y is an acid halide group, said interpolymer having an intrinsic viscosity of 0.1 to 10 dl/g as measured in benzene at 30°C.

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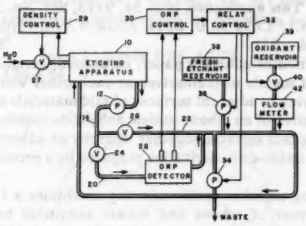
3,964,956

## SYSTEM FOR MAINTAINING UNIFORM COPPER ETCHING EFFICIENCY

H. Ben Snyder, Upland, Calif., assignor to General Dynamics Corporation, Pamona, Calif.

Division of Ser. No. 517,665, Oct. 24, 1974, Pat. No. 3,951,711. This application Oct. 6, 1975, Ser. No. 619,753
Int. Cl.[2] C23F 1/02
U.S. Cl. 156—345 10 Claims




1. Apparatus to etch copper work pieces which comprises;

a. etching machine means which utilize a working solution of etchant in which there is a tendency to convert ferric ions to ferrous ions, and in which the copper ion content of the solution has a tendency to increase as the etching progresses;

b. oxidation reduction potential detection means to continuously monitor the changes in concentration of ferric, ferrous and copper ions and to compare the same to the concentration in a reference solution;

c. oxidation-reduction potential control means adapted to adjust the ion concentrations in the working solution responsive to the change in oxidation reduction potential monitored by said detector means;

d. working solution dumping means responsive to said control means to dump a signaled quantity of working solution;

e. etchant solution rejuvenating means activated by said control means to add fresh etchant solution in a quantity at least equal to that dumped by said dumping means;

whereby, said control means, according to the oxidation-reduction potential change continuously monitored by said detection means, dumps old etchant and rejuvenates with fresh etchant to reduce the copper ion content of the solution and maintain a constant etch rate.

2. The apparatus of claim 1; further including

f. oxidizing means responsive to said control means for charging the working solution with oxidant to reconvert the ferrous ions to ferric ions and maintaining the various ion concentrations in substantially constant balance and concentration.

5. The apparatus of claim 1 further including;

g. density control means.

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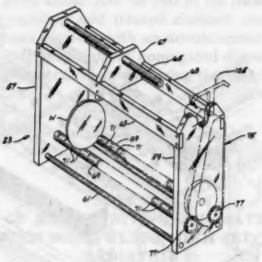
3,964,957

## APPARATUS FOR PROCESSING SEMICONDUCTOR WAFERS

Robert J. Walsh, Ballwin, Mo., assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 426,387, Dec. 19, 1973, abandoned. This application Sept. 30, 1974, Ser. No. 510,851
Int. Cl.[2] H01L 7/50
U.S. Cl. 156—345 11 Claims



1. Apparatus for uniform, damage-free chemical treatment of a plurality of generally circular wafers, said wafers each having substantially the same diameter, said apparatus comprising a frame adapted for being immersed in a chemical medium for treating said wafers, said frame including a pair of opposed end pieces, a pair of elongate rollers each extending longitudinally between said end pieces, each of said rollers having its respective ends journalled for rotation in said end pieces, said rollers being horizontal, the respective longitudinal axes of said rollers being in spaced, parallel relationship, each of said rollers having a plurality of annular grooves spaced uniformly along the length of the roller, grooves of one roller being laterally aligned with corresponding grooves of the other roller to provide parallel pairs of laterally aligned grooves, each of said grooves being of sufficient depth and of a crosssection shaped such that each laterally aligned pair of grooves is adapted to provide the sole means for guiding and supporting said wafers in a vertical plane, the spacing between the longitudinal axes of said rollers being substantially greater than the diameter of said wafers, the contact angle of said rollers defined by the included angle between the radii of said wafers at the points of contact of said wafers with the respective grooves of said rollers being approximately 105° to 115°, said laterally-aligned grooves thereby supporting a plurality of said wafers in spaced, parallel relationship, and means for driving at least one of said rollers whereby the driven roller causes rotation of each of said wafers while said wafers are maintained in said spaced, parallel relationship while immersed in said chemical medium and whereby said wafers are prevented from being contacted by each other or by other objects except the surfaces of said grooves.

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3,964,958

## HEAT BONDING DEVICE

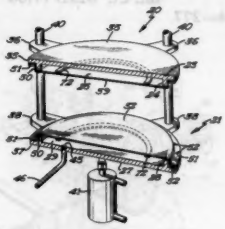
Orin B. Johnston, 5548 W. 78th St., Minneapolis, Minn. 55435

Continuation-in-part of Ser. No. 326,534, Jan. 24, 1973, abandoned. This application Aug. 22, 1974, Ser. No. 499,449
Int. Cl.[2] B29C 17/00
U.S. Cl. 156—382 23 Claims

1. In a device for bonding heat bondable materials in a desired seam configuration of the type having means for supporting the material, having means cooperating with said supporting means for applying pressure to the material and having means for applying heat to the material, the improvement which comprises:

said pressure applying means comprising means for applying a uniform pressure over a first area of the supported

material, said first area including the area of the desired seam configuration and being large relative thereto and said pressure applying means including a diaphragm in opposing relation to said material supporting means and spanning said first area; and



said heat applying means comprising heat generating means in intimate contact with said diaphragm and having a configuration conforming to the desired seam configuration for applying bonding heat to the area of the desired seam configuration of said material through said diaphragm, said heat generating means comprising metallic ribbon means fusion bonded to said diaphragm.

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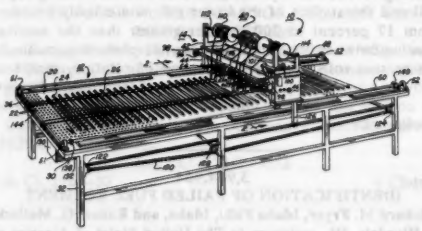
**3,964,959**

## HEATING STRUCTURE FABRICATING MACHINE AND METHOD

**Gerald E. Adams, Mishawaka, Ind., assignor to Easy Heat-Wirekraft, MSP Industries Corporation, Lakeville, Ind.**

**Filed Sept. 6, 1974, Ser. No. 503,924**
**Int. Cl.² H06B *3/00***
**U.S. Cl. 156—433** **11 Claims**



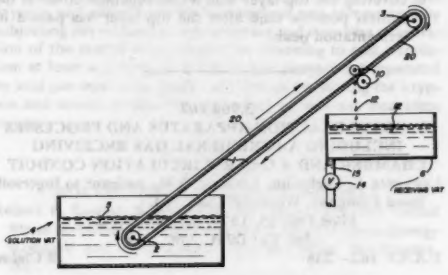
1. A machine for fabricating heating structures having heating wires with an external layer of thermoplastic material arranged with sections in a predetermined pattern and carrier strands of thermoplastic material fused to and interconnecting said wire sections: comprising a heating wire support means having spaced members on which wire sections are retained in a predetermined configuration and on a substantially common plane, a means for feeding a strand in a relatively cool condition to a heating wire section at said common plane and in a direction generally transverse to said wire section, a heating unit for simultaneously fusing a surface of said strand and an adjacent surface on said wire section in a transverse path, for immediate contact and union between said strand and said wire section in said path at said heated surface and progressively from one spaced section to another, a support means for said heating unit, and means for moving said heating unit and said wire support means relative to one another to join successive sections of said heating wire with said strand.

**3,964,960**

## PROCESS FOR CONCENTRATING BRINE

**Nelson S. Marans, Silver Spring, Md., assignor to W. R. Grace & Co., New York, N.Y.**

**Filed July 12, 1974, Ser. No. 487,922**
**Int. Cl.² B01D *1/22***
**U.S. Cl. 159—49** **3 Claims**



1. A process for concentrating brine solution comprising:
a. providing a continuous endless inclined belt having an exterior surface, an interior surface, an upper run, and a lower run between a brine containing vat in which the lower end of the belt is immersed and a receiving vat positioned at an elevation above said brine vat;
b. running said upper run of said endless belt from said brine vat to said receiving vat exposed to ambient to partially evaporate said brine;
c. providing a continuous layer of a self-supporting hydrophilic polyurethan foam on the exterior surface of said belt;
d. continuously exposing the upper run of said belt from said brine vat to the ambient atmosphere to evaporate water from the brine in said foam layer to form a concentrated brine in said foam layer;
e. continuously passing said lower run of said belt between rollers positioned over said receiving vat to continuously remove concentrated brine solution from said foam layer;
f. continuously collecting the removed concentrated brine solution in said receiving vat; and
g. removing the concentrated brine from said receiving vat.

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**3,964,961**

## METHOD FOR STORING BAGASSE

**Rolf Hesch, Nettetal, Germany, assignor to Becker & van Hullen Niederrheinische Maschinenfabrik, Krefeld, Germany**

**Continuation-in-part of Ser. No. 495,283, Sept. 8, 1974, abandoned, which is a continuation of Ser. No. 336,325, Feb. 27, 1973, abandoned. This application Mar. 11, 1975, Ser. No. 557,321**
**Claims priority, application Germany, Feb. 29, 1972, 2209465**
**Int. Cl.² D21C *5/00***
**U.S. Cl. 162—96** **6 Claims**

1. The method for storing bagasse in bulk to be used in the manufacture of articles having relatively high strength, in which the degradation of lignocellulose-containing fibers by hydrolysis and the decomposition of organic substances by bacteria and fungi is inhibited or prevented, comprising the steps of:
a. treating the bagasse before storing it to inhibit its fermentation rate;
b. piling the treated bagasse loosely in a first horizontal layer on a surface protected against ground water;
c. allowing fermentation to proceed at a controlled rate within said first horizontal layer, while allowing the heat and moisture within the pile to escape at a rate such that the temperature of the pile is prevented from building up

excessively, until fermentation has passed its peak, as evidenced by a drop in the temperature of the pile;

d. piling successive layers of treated bagasse loosely on top of said first layer to form a substantially layered structure in which the material in all layers is well-aerated, each layer being piled on only after the preceding layer has passed the peak of fermentation; and then

e. covering the top layer with a rain-repellent cover at the earliest possible time after the top layer has passed its fermentation peak.

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**3,964,962**

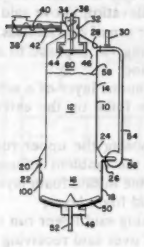
**GASEOUS REACTION APPARATUS AND PROCESSES INCLUDING A PERIPHERAL GAS RECEIVING CHAMBER AND A GAS RECIRCULATION CONDUIT**

**Lawrence A. Carlsmith, Amherst, N.H., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.**

**Filed Feb. 25, 1974, Ser. No. 445,212**

**Int. Cl.² D21C 7/00, 7/06**

**U.S. Cl. 162—236** **4 Claims**



**1.** Apparatus for the gaseous reaction of material, comprising a generally vertical vessel, material supply means connected to the upper end of said vessel for supplying material into such upper end, gas supply means connected to the upper end of said vessel for supplying gas into such upper end and to material therein, means for discharging material from the lower end of said vessel, said vessel including an upper portion and a therebelow adjoining lower portion of cross-section greater than said upper portion, the juncture of said vessel portions being substantially spaced intermediate the upper and lower ends of said vessel, the outer periphery of said vessel adjacent said juncture of said vessel portions being provided with gas discharge means open to said vessel for discharging gas therefrom, said gas discharge means including a gas receiving chamber extending along the outer periphery of said vessel and open to said vessel lower portion through an unrestricted opening to receive gas therefrom, said gas discharge means further including gas outlet means connected to said chamber for discharging gas from said chamber; said chamber, said unrestricted opening and said gas outlet means being free from screens and similar filtering media, gas recirculation conduit means connecting said gas outlet means with said upper end of said vessel for recirculating gas discharged from said vessel through said gas outlet means back into said upper end of said vessel, and blower means connected to said gas recirculation conduit means for causing gas discharged by said gas outlet means to flow through said gas recirculation conduit means towards said upper end of said vessel.

**3,964,963**

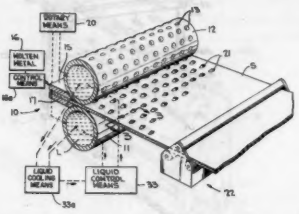
**APPARATUS FOR PRODUCING CONTINUOUS CAST METALLIC SHEET WITH PATTERNED SURFACE**

**Paul E. Anderson, Torrance, Calif., assignor to Martin Marietta Aluminum Inc., Torrance, Calif.**

**Division of Ser. No. 319,033, Dec. 27, 1972, Pat. No. 3,844,336. This application July 31, 1974, Ser. No. 493,487**

**Int. Cl.² B22D 11/06**

**U.S. Cl. 164—277** **5 Claims**




**1.** Apparatus for use in continuous casting from molten metal of substantially rigid metallic sheets having a pattern of spaced projections on at least one side, comprising in combination a pair of oppositely rotatable rolls set generally one above the other and spaced to provide a longitudinal nip therebetween, the surface of the upper roll having laterally and circumferentially spaced recesses thereon, said recesses having a depth between 5 to 100 percent of the nominal spacing at the nip between said rolls, a nozzle positioned on the upstream side of said rolls for feeding molten metal into a plenum chamber formed between the nozzle and the rolls, said nozzle having its outlet directed toward said nip between the rolls, means to supply molten metal through said nozzle under controlled pressure, said nozzle outlet from which molten metal enters said plenum chamber being located shortly upstream of that location in the plenum chamber where the spacing between the apex of each recess in the rotating upper roll and the surface of the lower roll momentarily becomes from 17 percent to 200 percent greater than the nominal spacing between the rolls at the nip therebetween, means to rotate said rolls at controlled speed of rotation, means to provide a cooling liquid to the interior of said rolls and means to control the cooling liquid flow to maintain the desired cooling rate.

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**3,964,964**

**IDENTIFICATION OF FAILED FUEL ELEMENT**

**Richard M. Fryer, Idaho Falls, Idaho, and Robert G. Matlock, Hinsdale, Ill., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed Oct. 15, 1974, Ser. No. 514,877**

**Int. Cl.² G21C 17/04**

**U.S. Cl. 176—19 LD** **1 Claim**

**1.** In a liquid metal cooled reactor having upward coolant flow and a plurality of vertically disposed fuel assemblies contained within a reactor vessel, each assembly having an outer closed sheath and a bundle of fuel pins consisting of a nuclear fuel enclosed within gas-tight claddings, a fuel handling machine including a gripper mechanism for grasping a handling adapter at the top of the fuel assemblies to remove and replace the fuel assemblies wherein said gripper mechanism includes gripper jaws at the lower end thereof, an orientation blade located therebetween, and the handling adapter includes an orientation slot at the top thereof, the orientation blade fitting in the orientation slot to establish the proper orientation of the gripper mechanism, said fuel handling machine being contained completely within said reactor vessel directly above the fuel assemblies:

a device for identifying failed fuel assemblies in their normal position within the reactor core, said device being within the outer sheath of each assembly and below the coolant level in the reactor vessel and comprising an inverted funnel of less diameter than that of the fuel assembly, disposed in each fuel assembly above the top of the fuel pins and including a normally closed valve at the apex thereof; and

an actuator rod attached to the normally closed valve extending upwardly through the axial center line of the adapter at the top of each fuel assembly and into the orientation slot therein wherein operation of the gripper mechanism to grasp the handling adapter of a fuel assembly depresses the actuator rod to open the valve, thereby releasing any bubble of radioactive fission gas which may be accumulated in the funnel.

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**3,964,965**

## PRESSURIZED-WATER REACTOR COOLANT GAS DISPOSAL SYSTEM

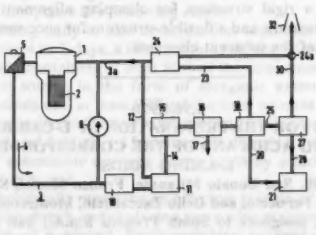
**Ivan Kausz, Weiher; Helmut Stunkel, and Harald Wille, both of Erlangen, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany**

**Filed Jan. 17, 1974, Ser. No. 434,356**

**Claims priority, application Germany, Jan. 22, 1973, 2302905**

**Int. Cl.² G21C *19/32***

**U.S. Cl. 176—37** **4 Claims**



1. A pressurized-water reactor installation comprising a pressure vessel and a core inside of said vessel, means for forming a main coolant pipe line loop for said vessel and containing a pressurized-water coolant having a continuous circulation through said loop, pressure vessel and core, said coolant containing a mixture of gases including as components hydrogen and relatively smaller amounts of radioactive krypton and xenon, a water coolant purification system including means for decompressing and cooling said coolant to separate at least a portion of said mixture from the coolant as a separated mixture, means for shunting a circulating portion of said circulation continuously through said system and producing the separated mixture, the separated mixture's krypton and xenon components preventing discharge of the separated mixture to the atmosphere, gas separation means for receiving the separated mixture and for separating at least some of said krypton and xenon from the hydrogen of said components by subjecting the mixture to condensation and step-wise evaporation of the components, means for returning to said circulation at least a portion of the hydrogen component separated by said gas separating means, and means for storing the krypton and xenon components separated by said gas separating means.

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**3,964,966**

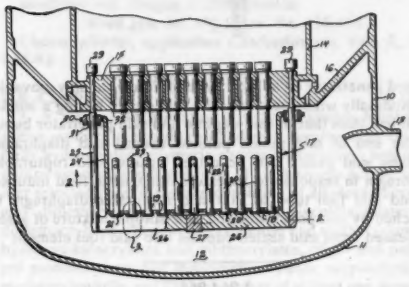
## MOLTEN CORE RETENTION ASSEMBLY

**Robert F. Lampe, Bethel Park, Pa., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed Aug. 25, 1975, Ser. No. 607,852**

**Int. Cl.² G21C *9/00***

**U.S. Cl. 176—38** **4 Claims**



1. In a liquid-metal-cooled fast breeder reactor including a core disposed within a pressure vessel and supported therein by a core support plate, the improvement comprising a molten core retention assembly disposed below the core comprising a horizontal, circular baffle plate of diameter greater than that of the reactor core having a plurality of openings therein, vertical heat-transfer tubes mounted in said openings and extending upwardly therefrom, and having flow holes near the upper end thereof, an imperforate, cylindrical baffle welded to the periphery of the baffle plate and extending upwardly therefrom, a plurality of radial beams intermittently welded to the under surface of said baffle plates and joined at the center by a hub, and a plurality of hanger rods adapted to be supported from the core support plate of the reactor, each of which has its lower end welded to the end of one of the radial beams, wherein said retention assembly is disposed within the pressure vessel of the reactor below the reactor core.

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**3,964,967**

## TAG GAS CAPSULE WITH MAGNETIC PIERCING DEVICE

**Ira V. Nelson, Richland, Wash., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Continuation of Ser. No. 403,309, Oct. 3, 1973, abandoned. This application Feb. 24, 1975, Ser. No. 552,398**

**Int. Cl.² G21C *3/16***

**U.S. Cl. 176—80** **2 Claims**

1. In a fuel element for a nuclear reactor comprising a substantially nonmagnetic fuel tube, an end cap closing one

end of said fuel tube, a multiplicity of stacked fuel pellets disposed within said tube and spaced from said end cap to form a plenum, the improvement comprising a substantially nonmagnetic sealed capsule fitting within said plenum with one end adjacent said end cap and containing an isotopic mixture of gases, said capsule having at said one end a thin, rupturable diaphragm spaced inwardly from said end cap of said fuel tube, and a ferromagnetic punch having a sharp-

pointed penetrator on at least one end, freely slidably movable longitudinally within said capsule, said punch having a length much less than that of said capsule and said penetrator being on the end of said punch pointed toward said diaphragm whereby said punch can be driven against said rupturable diaphragm in response to an external magnetic field induced around said fuel tube so that said rupturable diaphragm is breached by said penetrator and said isotopic mixture of gases is released from said sealed capsule into said fuel element.

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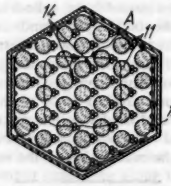
**3,964,968**

## NUCLEAR REACTOR FUEL ASSEMBLY

**Vitaly Vitalievich Kurilkin, ulitsa Shalyapina, 15, kv. 14, and Evgeny Vasilievich Kusmartsev, ulitsa Sovnarkomovskaya, 32, kv. 13, both of Gorky, U.S.S.R.**

**Filed Sept. 9, 1974, Ser. No. 504,231**
**Int. Cl.² G21C *3/12***
**U.S. Cl. 176—81** **1 Claim**



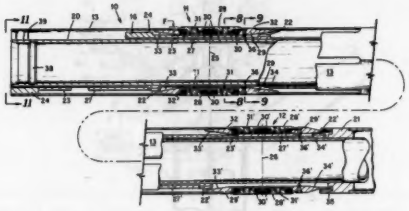

1. A fuel assembly for a nuclear reactor, comprising: a housing; fuel elements accommodated within said housing; a lateral surface of each of said fuel elements; spacer members, each of which is formed as a bunch of wires helically arranged on said lateral surface of at least some of said fuel elements; planes of contact, wherein said spacer members adjoin adjacent said fuel elements relative to those said fuel elements on which said spacer members are disposed; each of which said wires of said bunch of wires adjoins at least two adjacent wires along the entire length thereof; all said wires being rigidly interconnected between said planes of contact.

**3,964,969**

## INTERNAL CORE TIGHTENER

**Glen V. Brynsvold, San Jose, and Harold J. Snyder, Jr., Rancho Santa Fe, both of Calif., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed June 20, 1974, Ser. No. 481,299**
**Int. Cl.² G21C *5/08***
**U.S. Cl. 176—87** **5 Claims**



1. In a nuclear reactor utilizing a core composed of a plurality of closely adjacent fuel and control elements each having an outer casing and a spaced internal support tube; at least one internal core tightener for clamping adjacent elements comprising: an actuation sleeve positioned intermediate said support tube and said outer casing, said actuation sleeve being provided with at least one protruding cam-like member and at least one shoulder-forming member, said shoulder-forming member being located in spaced longitudinal relationship with said cam-like member, a load collar positioned about asid actuation sleeve intermediate said cam-like member and said shoulder-forming member thereof, and a plurality of preloaded load pad assemblies operatively positioned in openings in said outer casing, wherein axial movement of said actuation sleeve in one direction engages said shoulder forming member with said cam-like member causing said cam-like member to engage said load pad assemblies, moving said load pad assemblies outwardly and positions said load collar intermediate said actuation sleeve and said preloaded load pad assemblies forcing portions of said preloaded load pad assemblies to a position external of said outer casing for contacting adjacent elements, and axial movement of said actuation sleeve in the opposite direction withdraws said load collar from the position intermediate said actuation sleeve and said preloaded load pad assemblies and wherein said preloaded load assemblies constitute a rigid structure for clamping alignment of the adjacent elements and a flexible structure for accommodating expansion of the adjacent elements.

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**3,964,970**

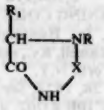
## PROCESS FOR THE PREPARATION OF L-CAR-BAMYL-AMINO ACIDS AND OF THE CORRESPONDING L-AMINO ACIDS

**Dino Dinelli, San Donato Milanese; Franco Morisi, San Giovanni in Persiceto, and Delio Zaccardelli, Monterotondo, all of Italy, assignors to Snam Progetti S.p.A., San Donato, Milanese, Italy**

**Filed May 10, 1974, Ser. No. 469,019**
**Claims priority, application Italy, May 11, 1973, 23957/73**
**Int. Cl.² C12D *13/06***
**U.S. Cl. 195—2** **23 Claims**

1. A process for the preparation of only one of the two stereoisomer forms of carbamylamino acids comprising:

a. subjecting to hydrolysis a racemic mixture of compounds of the formula



wherein X is selected from the group consisting of CO, CS and O, R is selected from the group consisting of hydrogen and hydrocarbon radicals having up to 8 carbon atoms, $R_1$ is the residue of an amino acid molecule wherefrom the

moiety has been removed, said hydrolysis being carried out in the presence of an enzyme which acts on the racemic mixture through a selective hydrolysis of only one of the optically active forms:

b. separating the sole resultant carbamyl amino acid stereoisomer.

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3,964,971

## METHOD FOR INCREASING THE VITAMIN $B_{12}$ PRODUCTION IN FERMENTATION PROCESSES CARRIED OUT WITH METHANOBACTERIA

**Béla Johan; László Szemler; János Fülöp; Tamas Szontagh; Emilia Simonovits née Czink; Judit Bekes nee Erdös; László Kuti; Robert Torös; Dénes Szekely; László Szabo; Károly Seitz; Tádé Vajda; Erzsébet Kovacs née Komoroczy; Anikó Hargitai nee Franyo, and Károly Polinszky, all of Budapest, Hungary, assignors to Richter Gedeon Vegyeszeti Gyar Rt., Budapest, Hungary**

**Filed Oct. 24, 1974, Ser. No. 517,797**

**Claims priority, application Hungary, Oct. 26, 1973, RI 523**

**Int. Cl.² C12D** *5/06*

**U.S. Cl. 195—28 VB** **1 Claim**

1. A method of increasing Vitamin $B_{12}$ production in a fermentation broth undergoing fermentation to produce Vitamin $B_{12}$ and containing a mixed population of a mesophilic methane-producing bacteria under anaerobic conditions which comprises the following steps:

a. adding daily to said fermentation broth, for a period of from 4 to 7 days, a first, broth-enriching nutrient concentrate containing at least 90% of the total amount of nitrogen source in the form of inorganic ammonium compounds and at least 90% of the total amount of a carbon source in the form of methanol and having an N:C weight ratio of 1:11 to 1:15 to increase the total concentration of assimilable nitrogen in the broth by a factor of maximum 4; and

b. periodically removing an effective portion of the fermentation broth and replacing same with an equal fresh portion of a second, broth-enriching nutrient concentrate also containing at least 90% of the total amount of a nitrogen source in the form of inorganic ammonium compounds and at least 90% of the total amount of a carbon source in the form of methanol and having an N:C weight ratio of 1:11 to 1:15 wherein the weight ratio of methanol carbon to ammonia nitrogen is 6 to 10% higher than that in the first nutrient concentrate added in step (*a*).

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3,964,972

## MODIFIED HETEROPOLYSACCHARIDES

**John Tinsman Patton, 1213 E. Houghton Ave., Houghton, Mich. 49931**

**Division of Ser. No. 15,590, March 2, 1970, Pat. No. 3,729,460. This application July 24, 1972, Ser. No. 274,658**

**The portion of the term of this patent subsequent to Apr. 24, 1990, has been disclaimed.**

**Int. Cl.² C12D** *13/04*

**U.S. Cl. 195—31 P** **8 Claims**

1. A process for preparing an improved thickening agent which comprises dispersing a heteropolysaccharide produced by the action of bacteria of the genus Xanthomonas on a carbohydrate in an aqueous reaction medium substantially free of polyvalent cations, increasing the pH of said reaction medium by the addition of NaOH, KOH, or $NH_3$ to above about 11, heating said reaction medium to a temperature above 150°F and maintaining the medium at this elevated temperature for a period of time to effect clarification.

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3,964,973

## PREPARATION OF INSOLUBLE BIOLOGICALLY ACTIVE COMPOUNDS

**Jiří Hradil; Jiří Čoupek; Miroslava Křivákova; Jiří Štamberg; Arthur Stoy, all of Prague, and Jaroslava Turková, Cesky Brod, all of Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia**

**Filed Jan. 30, 1974, Ser. No. 438,011**

**Claims priority, application Czechoslovakia, Feb. 5, 1973, 842-73**

**Int. Cl.² C07G** *7/02*

**U.S. Cl. 195—68** **5 Claims**

1. A method of preparing a water insoluble biologically active product comprising subjecting a macroporous substantially hydrophobic polymeric carrier comprising a homopolymer or copolymer derived from (1) at least one acrylic monomer selected from the group consisting of alkylenediacrylates and dimethacrylates, oligo- and polyglycoldiacrylates and dimethacrylates, alkylenediacrylamides and methacrylamides, hydroxyalkylacrylates and methacrylates, oligo- and polyglycol monoacrylates and monomethacrylates, acrylonitrile and methacrylonitrile, or (2) a copolymer of at least one monomer of group (1) above with a vinyl monomer selected from the group consisting of vinylaniline, vinylpyridine and vinylcarbazol, to a superficial hydrolysis treatment with an aqueous alkaline medium to form free carboxylic acid groups in a thin surface layer of said polymeric carrier, subjecting the resulting superficially hydrolyzed polymeric carrier to an activation treatment comprising converting said free carboxylic acid groups to active carboxylic acid anhydride groups, and contacting the resulting activated polymeric carrier with a biologically active protein compound capable of being insolubilized and bound by reaction with said anhydride groups in said polymeric carrier.

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3,964,974

## ENZYMATIC DETERMINATION OF GLUCOSE

**Dieter Banauch; Wolfgang Brummer; Wolfgang Ebeling; Roland Helger; Norbert Hennrich, and Hermann Lang, all of Darmstadt, Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany**

**Filed Sept. 10, 1973, Ser. No. 395,547**

**Claims priority, application Germany, Sept. 28, 1972, 2247608**

**Int. Cl.³ G01N** *31/14*; **C07G** *7/02*

**U.S. Cl. 195—103.5 C** **10 Claims**

1. An analytical agent for the quantitative enzymatic determination of glucose, consisting essentially of:

a. glucose dehydrogenase having a dry weight activity of at least 2 U/mg., the dinucleotide, 2 oxidase activity of which is less than 0.1% of said glucose dehydrogenase activity;

b. a pyridine coenzyme selected from the group consisting of NAD, NADP, thio-NAD, thio-NADP, nicotinamide purine dinulceotide, nicotinamide-(6-methylpurine)-dinucleotide and nicotinamide-(2-chloro-6-methylpurine)-dinucleotide in an amount sufficient to provide about a 2.0–5.0 millimole concentration in an analytical test solution;

c. means for maintaining an aqueous test solution of said analytical agent at a pH of about 6.5–8.5; and

d. mutarotase in an amount sufficient to increase the spontaneous mutarotation of α-glucose to β-glucose in said test solution by more than 50%.

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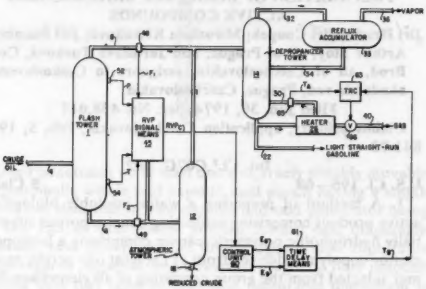
**3,964,975**

## MEANS FOR CONTROLLING THE TEMPERATURE OF A DEPROPANIZER TOWER

**Charles W. Harrison, Nederland, and Glenn A. Senters, Beaumont, both of Tex., assignors to Texaco Inc., New York, N.Y.**

**Filed Aug. 19, 1974, Ser. No. 498,331**
**Int. Cl.² B01D 3/42; C10G 7/02; G05B 21/02**
**U.S. Cl. 196—132** **5 Claims**



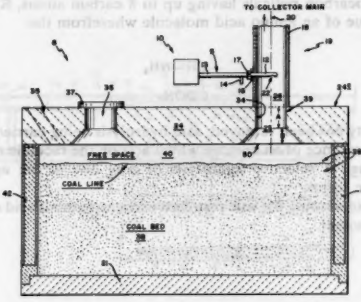

1. A refining unit comprising a flash tower receiving raw crude oil, an atmospheric tower receiving a flashed crude oil from said flash tower, a depropanizer tower receiving a light component vapor from said flash tower and producing gasoline, recirculating means including a heater for withdrawing, heating to a desired temperature and recirculating a portion of said gasoline back to said depropanizer tower, said refining unit further including a control system comprising flow rate sensing means for sensing the flow rates of the vapor and the flashed crude oil and providing signals corresponding thereto, pressure sensing means for sensing the pressure in the flash tower and providing a corresponding signal, first temperature sensing means for sensing the temperature of a liquid in the flash tower and providing a signal related thereto, Reid Vapor pressure signal means sampling the flashed crude oil and receiving the flow rate signals, the pressure signal and the temperature signal, for providing a signal corresponding to the current Reid Vapor Pressure of the raw crude oil, second temperature sensing means for sensing the temperature of the gasoline being recirculated back to the depropanizer tower and providing a signal corresponding thereto, desired temperature signal means for providing a signal corresponding to the desired temperature for the gasoline being recirculated back to the depropanizer tower, change signal means connected to the desired temperature signal means and to the Reid Vapor Pressure signal means for providing a change signal to the desired temperature signal means so as to cause the desired temperature signal means to change the amplitude of the desired temperature signal at some predetermined time after a change in the Reid Vapor Pressure has occurred and in accordance with the current Reid Vapor Pressure signal, and control means receiving the desired temperature signal and the sensed gasoline temperature signal for controlling the heater so as to control the temperature of the gasoline being recirculated back to the depropanizer tower.

**3,964,976**

## PROCESS FOR CLEANING COKE OVEN GAS OFFTAKES

**James Oliver Pettrey, Jr., Huntington, W. Va., and Rufus Furman Davis, Jr., Russell, Ky., assignors to Allied Chemical Corporation, New York, N.Y.**

**Filed June 28, 1974, Ser. No. 484,357**
**Int. Cl.² C10B 43/02, 43/14, 57/00**
**U.S. Cl. 201—2** **8 Claims**




1. In a process for the coking of coal in a coke oven chamber having gas offtakes wherein said coking of coal is effected at flue temperatures from 1900° to 2600°F., the improvement which comprises contacting the inner surfaces of said gas offtakes with steam during the coking operation in an amount sufficient to react with the carbon deposits formed on said inner surfaces during said coking operation, said steam being at a temperature sufficient to maintain the temperature of said inner surfaces above 1472°F., whereby gaseous reaction products of said steam and carbon deposits are obtained while a substantial buildup of carbon deposits on said inner surfaces is prevented.

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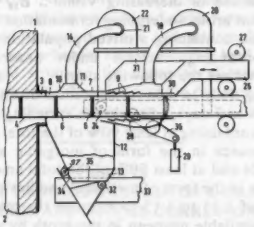
**3,964,977**

## METHOD AND APPARATUS FOR OPERATING A LEVELING DEVICE FOR A COKING OVEN

**Dietrich Haase, Mayen, Germany, assignor to Hartung, Kuhn & Co. Maschinenfabrik GmbH, Dusseldor:, Germany**

**Filed Nov. 5, 1975, Ser. No. 629,078**
**Int. Cl.² C10B 37/04**
**U.S. Cl. 201—40** **12 Claims**



1. A method of operating a leveling rod for leveling coal in a horizontally extending coking chamber of the coking oven, in which the rod passes with clearance through an opening in an end wall of the coking chamber into the latter and with a portion thereof outside the chamber with clearance through a channel, said channel having two ends and communicating at one end thereof with said opening, said method comprising the steps of reciprocating the leveling rod; feeding air under pressure into the other end of said channel; sucking air from the region of said one end of the channel out of the latter; and adjusting the relationship between the air fed into and sucked

out from the channel so that the amount of air fed into the other end of said channel, at any internal pressure in said chamber, is equal to the amount of air sucked from the region of said one end of said channel to thereby prevent passage of gases from the interior of the chamber through said opening and said channel to the outside of the coking oven, without feeding any of the air into the chamber.

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**3,964,978**

## $NO_x$ POLYMERIZATION INHIBITOR FOR VINYL AROMATIC COMPOUND DISTILLATION

**James M. Watson, Big Spring, Tex., assignor to Cosden Technology, Inc., Big Spring, Tex.**

**Filed Dec. 9, 1974, Ser. No. 531,069**
**Int. Cl.² B01D** *3/34, 3/10;* **C07C** *7/18*
**U.S. Cl. 203—9** **6 Claims**

1. A process for the distillation of a readily polymerizable vinyl aromatic compound, which comprises subjecting such compound to distillation conditions in the presence of a polymerization inhibitor consisting essentially of from about 50 ppm to about 2000 ppm of nitrogen dioxide ($NO_2$) and at a temperature of from about 150°F. to 300°F.

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**3,964,979**

## NO POLYMERIZATION INHIBITOR FOR VINYL AROMATIC COMPOUND DISTILLATION

**James M. Watson, Big Spring, Tex., assignor to Cosden Technology, Inc., Big Spring, Tex.**

**Filed Dec. 9, 1974, Ser. No. 531,202**
**Int. Cl.² B01D** *3/34, 3/10;* **C07C** *7/18*
**U.S. Cl. 203—9** **6 Claims**

1. A process for the distillation of a readily polymerizable vinyl aromatic compound, which comprises subjecting such compound to distillation at a temperature between about 150 and 300°F. a polymerization inhibitor consisting essentially of nitric oxide (NO) in an amount of from about 20 ppm to about 3000 ppm, and in the substantial absence of oxygen.

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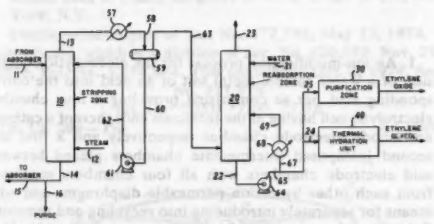
**3,964,980**

## PROCESS FOR THE RECOVERY OF ETHYLENE OXIDE

**Brian I. Ozero, New York, N.Y., assignor to Halcon International, Inc., New York, N.Y.**

**Filed Mar. 24, 1975, Ser. No. 561,515**
**Int. Cl.² C01D** *1/14*
**U.S. Cl. 203—42** **6 Claims**




1. In the process for recovering ethylene oxide from the gaseous reaction effluent produced in the silver catalyzed, vapor-phase, partial oxidation of ethylene with molecular oxygen, the recovery process comprising the steps of: (a) countercurrently contacting the effluent with an aqueous scrubbing solution thereby producing an ethylene oxide-containing absorbate, (b) stream stripping said absorbate within a stripping zone containing a plurality of vaporliquid contacting stages to generate an ethylene-oxide containing stripper overhead vapor and (c) reabsorbing the ethylene oxide within a reabsorption zone containing a plurality of vapor-liquid contacting stages by countercurrent contact of the stripper overhead vapor with water to generate a reabsorbate suitable for further processing to recover ethylene therefrom and for thermal hydration of the ethylene oxide dissolved in said reabsorbate to form ethylene glycols, the improvement which comprises:

a. Subjecting the stripper overhead vapor to a partial condensation so that at least about 50% of the water contained therein is condensed while less than 20% of the ethylene oxide contained therein is condensed and returning the condensate from the partial condensation as reflux to an upper portion of the stripping zone;
b. Introducing the uncondensed portion of the stripper overhead vapor to the reabsorption zone;
c. Cooling a portion of the reabsorbate; and,
d. Recycling said cooled reabsorbate and introducing it to a point within the reabsorber intermediate between the points at which the uncondensed portion of the stripper overhead vapor and the water are introduced to the reabsorption zone, the amount of said cooled reabsorbate being at least 0.2 part by weight per part by weight of reabsorbate not cooled.

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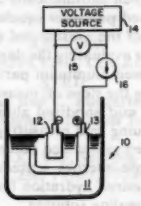
**3,964,981**

## METHOD FOR POLAROGRAPHIC ANALYSIS USING AN ELECTRODE OF TANTALUM/CARBON MATERIAL

**Henry M. Stahr, Ogden, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa**

**Continuation of Ser. No. 244,133, April 14, 1972, abandoned. This application Sept. 20, 1973, Ser. No. 399,075**
**Int. Cl.² G01N** *27/48, 27/30*
**U.S. Cl. 204—1 T** **1 Claim**



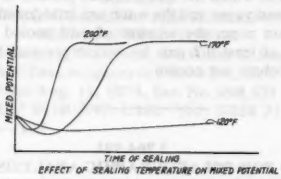

1. In a method of polarographic analysis of a species in an electrolyte including the steps of contacting said electrolyte with a reference electrode; contacting said electrolyte with an active electrode; applying an increasing voltage between said electrodes; and measuring the current flowing between said electrodes to produce an abruptly increasing current followed by a generally constant current, the voltage at which said increasing current appears being representative of a particular species and the magnitude of said constant current being representative of the quantity of the identified species; the improvement wherein said step of contacting said electrolyte with an active electrode comprises contacting said electrolyte with a tantalum/carbon material formed by vacuum-depositing carbon on a tantalum substrate by heating tantalum in a vacuum furnace in the presence of carbon at a temperature in the range 800° – 1,200°C. and depositing carbon on said tantalum substrate until the surface of said substrate turns gold, said material characterized in being inert to hydrofluoric acid and aqua regia.

3,964,982

## METHOD AND APPARATUS FOR CONTROLLING THE DEGREE OF HYDRATION IN SEALING OF ANODIZED ALUMINUM

Duk Hwang Kim, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

Continuation-in-part of Ser. No. 490,832, July 22, 1974, abandoned. This application June 16, 1975, Ser. No. 587,177
Int. Cl.² G01N 27/26; C25D 5/44
U.S. Cl. 204—1 T 2 Claims



EFFECT OF SEALING TEMPERATURE ON MIXED POTENTIAL

1. In the process for producing a sealed, anodized film on an aluminum surface, said process including the steps of anodizing said surface so as to produce a porous aluminum oxide film on said surface and thereafter sealing said surface, in which the improvement comprises a process for evaluating the degree of hydration during said sealing step including the step of measuring the mixed potential of the anodized aluminum surface; electrically recording said mixed potential with respect to time; and then automatically terminating said sealing step when said mixed potential equals a predetermined voltage representative of the preselected degree of hydration.

2. The process for evaluating the degree of hydration during sealing of an anodized aluminum part immersed in a sealing solution, comprising the steps of: measuring and recording the mixed potential of said anodized aluminum part during said sealing, and continuing said measuring and recording of said mixed potential when said mixed potential does not exceed, in a predetermined time internal, a predetermined voltage level representative of desired hydration level in order to evaluate the quality of said sealing solution.

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3,964,983

## PROCESS FOR THE ELECTROCHEMICAL SYNTHESIS OF ORGANIC METAL COMPOUNDS

Wilhelm Eisenbach; Herbert Lehmkuhl, and Günther Wilke, all of Mulheim (Ruhr), Germany, assignors to Studiengesellschaft Kohle m.b.H., Mulheim (Ruhr), Germany

Filed Oct. 3, 1973, Ser. No. 403,239
Claims priority, application Austria, Oct. 5, 1972, 8547/72
Int. Cl.² B01K 3/00
U.S. Cl. 204—59 L 25 Claims

1. Process for the reaction of an H-acidic organic compound in which the acidic H-atom is bonded by oxygen or sulphur to the organic radical and which has a pK value of up to about 20, with a metal having a standard potential which is more positive than −1.66 volts and which does not or only incompletely reacts with the H-acidic compound under current-free conditions, wherein the H-acidic compound or its solution in polar solvent is made conducting by addition of a soluble salt of at least one of Li, Na, K, Rb and Cs and at least one of chloride, bromide and iodide and is electrolysed at temperatures up to 150°C, using said metal as the anode, and the reaction product of the H acidic compound and the metal anode is recovered.

3,964,984

## METHOD OF PRODUCING PHOTOCHROMIC SODALITE CRYSTALS

Shavkat Vakhidov, ulitsa Beruni, 3, kv. 2; Mokhira Akhadovna Vakhidova, ulitsa Lenina, 11, kv. 14, both of poselok Ulugbek, Tashkentskaya oblast; Anatoly Nikolaevich Lobachev, ulitsa Fersmana, 3, kv. 68, Moscow; Oleg Konstantinovich Melnikov, Profsojuznaya ulitsa, 111, korpus 3, kv. 228, Moscow, and Nina Sergeevna Triodina, Universitetsky prospekt, 4, kv. 501, Moscow, all of U.S.S.R.

Filed Jan. 24, 1973, Ser. No. 326,338
Claims priority, application U.S.S.R., Feb. 4, 1972, 1739751
Int. Cl.² B01J 1/10
U.S. Cl. 204—157.1 H 5 Claims

1. A method of producing photochromic sodalite crystals which comprises exposing sodalite crystals to the effects of a penetrating ionizing radiation field in a chlorine-free atmosphere for a period of time necessary for the activation of the photochromic centers in said crystals.

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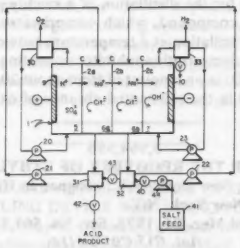
3,964,985

## ELECTRODIALYSIS APPARATUS AND PROCESS FOR ION MODIFICATION

Anthony J. Giuffrida, North Andover, Mass., assignor to Ionics, Incorporated, Watertown, Mass.

Filed Oct. 29, 1974, Ser. No. 518,587
Int. Cl.² B01D 13/02
U.S. Cl. 204—180 P 6 Claims



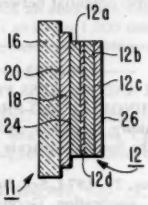

1. An ion-modification process for the electrolytic conversion of a water soluble metal salt of an acid into the corresponding acid per se comprising providing a four chamber electrolytic cell having at the terminals ends thereof a cathode and anode electrode chamber respectively and a first and second juxtaposed intermediate chambers placed between said electrode chambers with all four chambers separated from each other by cation permeable diaphragms and with means for separately introducing into recycling and removing fluids from the respective chambers via separate liquid holdup tank means associated with each of said chambers, the process comprising having aqueous acid salt solution in both said first and second intermediate chambers, having conductive aqueous solutions in the electrode chambers, the said anolyte solution being capable of producing hydrogen ions at the anode electrode, imposing a direct current transversely through all four chambers to cause hydrogen ions from the anolyte to migrate through the adjacent cation membrane diaphragm into the said first adjacently disposed intermediate chamber and to cause metal ions from the said salt solution of the said first intermediate chamber to migrate through the next adjacent membrane into the second adjacently disposed intermediate chamber and removing the resulting solution in said first intermediate chamber as the acid product.

3,964,986

## METHOD OF FORMING AN OVERLAYER INCLUDING A BLOCKING CONTACT FOR CADMIUM SELENIDE PHOTOCONDUCTIVE IMAGING BODIES

Gordon Mark, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Mar. 31, 1975, Ser. No. 563,815
Int. Cl.² C23C 15/00; H01J 39/00
U.S. Cl. 204—192 9 Claims




1. A method of forming a transition material region along a surface portion of a first material region of a photoconductive imaging body wherein the material composition of the transition material region comprises a graded atomic transition of the material of the first material region with increasing amounts of aluminum and oxygen in a direction proceeding away from the first material region, including the steps of:

a. bombarding a deposition surface portion of the photoconductive body with electrons to achieve a current through said body of less than about 8 mA. per cm.² of surface area of said deposition surface portion in an atmosphere of oxygen at a pressure of from about 0.1 to about 0.5 torr, and simultaneously

b. subjecting the deposition surface portion of the photoconductive body to vapors of aluminum, or oxygen compounds thereof, to cause deposition of aluminum and oxygen along said deposition surface portion to form said transition material region.

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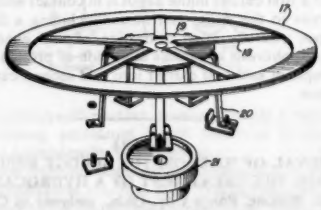
3,964,987

## ELECTROPLATING APPARATUS

Merlyn R. Reppert, Torrance, and Thomas M. Beckwith, Riverside, both of Calif., assignors to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of Ser. No. 472,745, May 23, 1974, abandoned, which is a division of Ser. No. 420,109, Nov. 29, 1973, Pat. No. 3,874,054. This application Oct. 4, 1974, Ser. No. 511,978
Int. Cl.² C25D 17/06, 17/10
U.S. Cl. 204—194 6 Claims



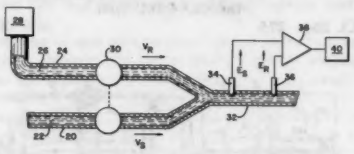

1. A collector for use in plating wheel centers comprising an insulating plug, and metal base, a plurality of metal legs between said base and the upper face of said plug, foot plates on each of said legs, said plug being connectable to said base plate.

3,964,988

## ELECTROCHEMICAL MONITORING

John H. Riseman, Cambridge, and Martin Frant, Newton, both of Mass., assignors to Orion Research Incorporated, Cambridge, Mass.

Filed Jan. 19, 1972, Ser. No. 218,881
Int. Cl.² G01N 27/46
U.S. Cl. 204—195 M 6 Claims




1. Apparatus for electrochemical monitoring of a first liquid flow stream for the presence of an ionic species of interest comprising in combination;

a second liquid flow stream containing the ion species of interest and a second non-interfering ion species in a substantially fixed ratio to one another;

means for combining said first and second flow streams to provide a mixed liquid;

one electrochemical electrode for providing an electrical signal as a function of the activity of said ionic species of interest in said mixed liquid:

another electrochemical electrode for providing an electrical signal as a function of the activity of said second species of ion in said mixed liquid;

both of said electrodes being disposed in operative contact with said mixed liquid; and

means for determining a difference signal between the electrical signals from said electrodes.

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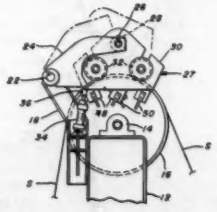
3,964,989

## APPARATUS FOR SUPPLYING CURRENT TO A MOVING STRIP

Robert E. Ackerly, and Roy C. Bongartz, both of Pittsburgh, Pa., assignors to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.

Filed Jan. 13, 1975, Ser. No. 540,379
Int. Cl.² C25D 17/00, 17/06, 7/06
U.S. Cl. 204—211 7 Claims




1. Apparatus for supplying electric current to a moving strip comprising a strip support roll having a length at least as great as the width of the strip, means directing said strip around a substantial arc of said support roll, a pair of rotatable conductor rolls having a length at least as great as the width of the strip, means mounting said pair of conductors rolls in spaced apart relationship around the outer periphery of the support roll with their axes parallel to the axis of the support roll and their periphery in engagement with said strip where it is in contact with said support roll so that said strip is held for its full width between said support roll and one of said conductor rolls and and then between said support roll and the other of

said conductor rolls, and means for supplying electric current to said conductor rolls.

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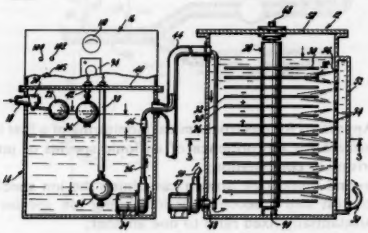
**3,964,990**

## PRECIOUS METAL RECOVERY SYSTEM

**Stanley Woyden, 1575 High Ridge Road, Stamford, Conn. 06903**

**Filed Nov. 4, 1974, Ser. No. 520,246**
**Int. Cl.² C25C 7/00**
**U.S. Cl. 204—275** **4 Claims**



**1.** A system for recovering metals from solution comprising a recovery tank having electrodes positioned therein, means for applying an electrolysis voltage to said electrodes, a holding tank for receiving liquid from a liquid source, means for feeding liquid from said holding tank to said recovery tank, means for sensing when the concentration of metal in said recovery tank deviates from a desired concentration, and control means responsive to said sensing means for activating said feeding means when the metal concentration in said recovery tank deviates from said desired concentration so as to transfer liquid from said holding tank to said recovery tank to automatically provide proper electrolyte concentration for plating.

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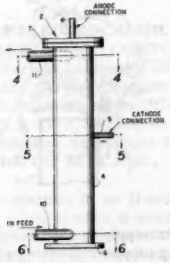
**3,964,991**

## METHOD AND APPARATUS FOR PRECIPITATING COLLOIDS FROM AQUEOUS SUSPENSIONS

**John K. Sullins, Kingsport, Tenn., assignor to Canton Textile Mills, Inc., Canton, Ga.**

**Filed July 28, 1975, Ser. No. 599,878**
**Int. Cl.² C25B 9/00, 11/02**
**U.S. Cl. 204—275** **5 Claims**




**1.** A flocculation cell comprising a cylindrical enclosure formed of electrically conductive material, an elongated generally cylindrical electrode of electrically conductive material disposed within said enclosure in insulated relation thereto and arranged with its major axis in substantially coincidental relation with the major axis of said cylindrical enclosure to define an annular passage therebetween, an inlet formed in the cylindrical wall of said enclosure at one end thereof and generally tangentially disposed relative to the inner surface of said wall and arranged to impart swirling motion in said annular passage to liquid supplied to said enclosure through said inlet, an outlet formed in the cylindrical wall of said enclosure at the other end thereof and generally tangentially disposed relative to the inner surface of said wall and arranged to exhaust liquid from said annular passage tangentially thereof and in the same general direction as the direction of swirling movement thereof so as to facilitate flow of liquid in a generally helical path through said annular passage, and means for impressing an electric potential between said enclosure and said electrodes.

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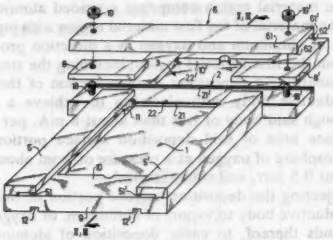
**3,964,992**

## CHAMBER AND PROCESS FOR CROSSED IMMUNOELECTRO-PHORESIS

**Walter Krotz, Hamburg, Germany, assignor to Medac Gesellschaft fur klinische Spezialpraparate mbH, Hamburg, Germany**

**Filed Dec. 27, 1974, Ser. No. 536,964**
**Claims priority, application Germany, Dec. 31, 1973, 2365284; Oct. 11, 1974, 2448552**
**Int. Cl.² G01N 27/26, 27/28**
**U.S. Cl. 204—299 R** **19 Claims**



**1.** A chamber comprising:

a. a base plate,

b. means defining a well in said base plate,

c. means subdividing the well in said base plate into two well portions, a migration well and a connecting well, said well adapted to receive a second carrier for performing a second crossed-electrophoresis step following prior electrophoretic separation of a protein-containing sample in a first carrier, said means for subdividing said well into a migration well and a connecting well including,

d. a depot, said depot adapted to receive a protein-containing sample in a first carrier for separation in a second carrier in a direction at right angles to a first separating direction of the protein-containing sample,

e. means defining a vertically variable gap in said depot so that a first carrier in the depot is in contact with a second carrier in the wells, said means including a lid for said depot whereby upon utilization of said chamber with electrophoresis apparatus migration of protein from said sample in said first carrier into said second carrier takes place.

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**3,964,993**

## REMOVAL OF HF FROM THE SLUDGE RESULTING FROM THE TREATMENT OF A HYDROCARBON

**Hugh E. Romine, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.**

**Filed Jan. 23, 1975, Ser. No. 543,592**
**Int. Cl.² C10G 17/00**
**U.S. Cl. 208—13** **4 Claims**

**1.** A process for removing HF from the sludge resulting from the HF treatment of hydrocarbons, said process comprising:

a. adding to the sludge, aqueous caustic and more than 10%, by volume, based on the sludge, of a liquid aromatic diluent containing at least 30 weight percent aromatics, to form an admixture,
b. allowing the admixture of step (a) to form an aqueous phase and a hydrocarbon phase, and
c. separating the aqueous phase and the hydrocarbon phase, said process being characterized further in that:
a. the aqueous caustic solution contains from about 1 to about 50 weight percent caustic, and
b. the amount and concentration of aqueous caustic are such as to provide an amount of caustic which is in the range of about 1 to about 1,000 times the stoichiometric requirement, based on the HF present in the sludge.

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## 3,964,994
## $H_2O_2$-CONTAINING MICELLAR DISPERSIONS

**Joe T. Kelly, deceased, late of Littleton, Colo. (by LaVerne S. Kelly, executrix), assignor to Marathon Oil Company, Findlay, Ohio**

**Division of Ser. No. 880,959, Nov. 28, 1969, Pat. No. 3,647,653. This application July 19, 1971, Ser. No. 164,109**
**Int. Cl.² C10G 27/04**
**U.S. Cl. 208—196** **4 Claims**

1. A process for dispersing hydrogen peroxide in liquid media comprising organic compounds in which hydrogen peroxide is not substantially dispersible normally, comprising:
a. forming a stable hydrogen peroxide-containing micellar dispersion comprising the components hydrocarbon, aqueous medium, hydrogen peroxide, and surfactant capable of dispersing the components, and,
b. admixing the hydrogen peroxide-containing micellar dispersion with said liquid media so that the hydrogen peroxide intimately comes into contact with and becomes dispersed through the liquid media.

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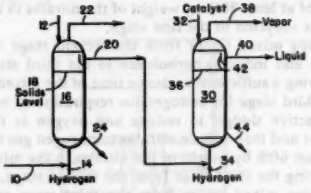
## 3,964,995
## HYDRODESULFURIZATION PROCESS

**Ronald H. Wolk, Lawrence Township, Mercer County; Seymour B. Alpert, Princeton, and Michael C. Chervenak, Pennington, all of N.J., assignors to Hydrocarbon Research, Inc., Morristown, N.J.**

**Continuation of Ser. No. 274,221, July 24, 1972, abandoned, Continuation of Ser. No. 56,617, July 20, 1970, abandoned. This application June 21, 1974, Ser. No. 481,797**
**Int. Cl.² C10G 23/02**
**U.S. Cl. 208—210** **4 Claims**




1. In a hydrodesulfurization process wherein a metal- and sulfur-containing petroleum liquid residuum feedstock is treated in a hydrodesulfurizing step by
feeding the residuum together with hydrogen upwardly into a desulfurization reaction zone maintained under ebullated bed hydrodesulfurization conditions with a temperature between about 700° and about 825°F and a pressure between about 1000 and about 3000 psig, while maintaining in said desulfurization zone a high density, substantially non-porous particulate solid catalyst selected from the group consisting of cobalt molybdate on alumina and nickel molybdate on alumina in random motion in the liquid, said catalyst having a porosity not greater than 0.1 cc/g of cumulative pore volume for pores having diameters larger than 250A to recover a reiduum containing less than one percent sulfur;
the improvement which comprises:
pretreating the metal-containing residuum before substantial desulfurization to remove vanadium or nickel by
feeding said residuum with a hydrogen-containing gas to a pretreatment zone maintained at a temperature between about 700° and 825°F and a pressure between 1000 and 3000 psig;
maintaining in said pretreatment zone a bed of particulate contact solids containing at least 75 weight percent porous alumina and containing about 7½ to 22 weight percent metal oxide promoter consisting essentially of a mixture of $Fe_2O_3$, $TiO_2$ and $SiO_2$, and mixtures thereof;
feeding said contact solids to the reaction zone at a rate sufficient to achieve at least 40 percent removal of vanadium, said contact solids being maintained in random motion in the liquid by the residuum feed and hydrogen-containing gas,
whereby the desulfurization catalyst has increased life and sulfur removal is enhanced.

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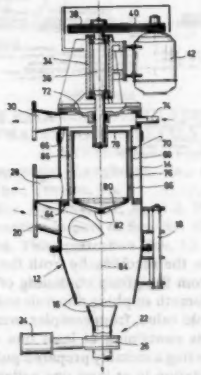
## 3,964,996
## CLASSIFYING UNIT FOR FIBROUS SUSPENSIONS

**Emil Holz, Eningen, and Reinhold Kapernick, Reutlingen, both of Germany, assignors to Hermann Finckh Metalltuch- und Maschinenfabrik, Reutlingen, Germany**

**Filed Feb. 28, 1975, Ser. No. 554,150**
**Claims priority, application Germany, Mar. 20, 1974, 2413310**
**Int. Cl.² B03B 7/00**
**U.S. Cl. 209—17** **15 Claims**




1. A classifying unit for fibrous suspensions including in combination, a housing having an upper portion and a lower vortex cleaner forming portion, a stationary vertically disposed screen cage mounted in said upper housing portion, a generally cylindrical rotor closed over its circumferential portion and over its bottom, means mounting said rotor for rotary movement within said screen cage, a stirring element carried by the outer surface of said cylindrical portion of said rotor for cooperation with said screen cage for clearing the openings of said screen cage and the space between said screen cage and said rotor, means providing a heavy material outlet at the bottom of said vortex cleaner portion, means providing said upper housing portion with an accepted stock outlet communicating with the outer side of said screen cage, means providing said housing with an inlet adjacent to the bottom of said rotor for the admission of a suspension to be classified, means providing said housing with an outlet located

above said screen cage for the removal of the separated fraction of the suspension, and means mounted on said rotor adjacent to said inlet for circulating the suspension to be classified within said vortex cleaner portion.

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## 3,964,997

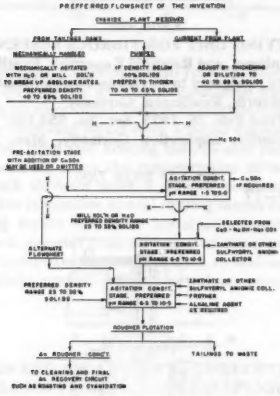
## CONCENTRATION OF GOLD, SULPHIDE MINERALS AND URANIUM OXIDE MINERALS BY FLOTATION FROM ORES AND METALLURGICAL PLANT PRODUCTS

David Weston, 34 Parkwood Ave., Toronto, Ontario, Canada

Continuation-in-part of Ser. No. 409,328, Oct. 24, 1973, abandoned, which is a continuation-in-part of Ser. No. 339,384, March 3, 1973, Pat. No. 3,919,079. This application Sept. 26, 1974, Ser. No. 509,428

Int. Cl.[2] B03D *1/02*

U.S. Cl. 209—166 41 Claims


PREFERRED FLOWSHEET OF THE INVENTION
OXIDE PLANT RESIDUE
FROM TAILINGS DUMP
CURRENT FROM PLANT
MECHANICALLY HANDLED
THICKEN
ADJUST BY THICKENING OR DILUTION TO 40 TO 60 % SOLIDS
MECHANICALLY AGITATED WITH H2O OR MILL DISCH. TO BREAK UP AGGLOMERATES. PREFERRED DENSITY 40 TO 60% SOLIDS
IF DENSITY BELOW 40% SOLIDS USE PREFER TO THICKEN TO 40 TO 45% SOLIDS
PRE-AGITATION STAGE WITH ADDITION OF Ca(OH)2 MAY BE USED OR OMITTED
H2SO4
AGITATION CONDIT. STAGE PREFERRED pH RANGE 1.0 TO 5.0
IF REQUIRED
WILL GIVE % OR MAY PREFERRED DENSITY RANGE 25 TO 35% SOLIDS
SELECTED FROM CuSO4 - Na2SiO3 - NaCN
ALTERNATE FLOWSHEET
DISTRIBUTION CONDIT. STAGE PREFERRED pH RANGE 6.0 TO 10.5
XANTHATE OR OTHER SULPHYDRYL ANION. COLLECTOR
PREFERRED DENSITY RANGE 25 TO 35% SOLIDS
AGITATION CONDIT. STAGE PREFERRED pH RANGE 6.5 TO 10.5
XANTHATE OR OTHER SULPHYDRYL ANIONIC COLL. FROTHER
ALKALINE AGENT AS REQUIRED
ROUGHER FLOTATION
AN ROUGHER CONCT
TAILINGS TO WASTE
TO CLEANING AND FINAL AN. RECOVERY CIRCUIT SUCH AS ROASTING AND CYANIDATION

1. A process for the recovery by froth flotation of mineral values selected from the group consisting of gold, silver sulphide minerals, bismuth sulphide minerals and uranium oxides associated with gold value, from complex ores and metallurgical plant products containing at least one of said minerals comprising: subjecting a suitably prepared pulp of the material to mechanical agitation in at least one agitation conditioning stage wherein the pH of the said pulp has been lowered with an acid agent to an optimum pH point within the pH range of about 1.5 to 5.0 and wherein the agitation conditioning is for a sufficient period of time to bring about heavy activation of at least one of the said mineral values in at least one subsequent mechanical agitation conditioning stage wherein the said pulp is further agitation conditioned for a sufficient period of time and at an optimum pH point in the pH range of about 5.0 to 11.5 and in the presence of an alkaline agent when the said optimum pH point is in the pH range of about 6.0 to 11.5 and in the presence of at least one collector selected from the group of sulfhydryl anionic sulphide mineral collectors to produce the said heavy activation of at least one of the said mineral values; and subsequently in the presence of a frother subjecting the said agitation conditioned pulp to flotation to produce a concentrate enriched in at least one of the said mineral values, and a tailings product impoverished in at least the same said mineral value.

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## 3,964,998

## IMPROVEMENTS IN AND RELATING TO WASTE WATER TREATMENT

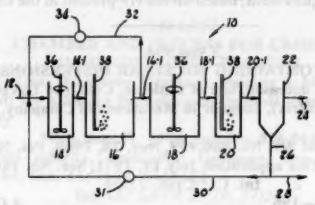
James Laing Barnard, Pretoria, Transvall, South Africa, assignor to The South African Inventions Development Corporation. Pretoria. Transvall, South Africa

Continuation of Ser. No. 377,390, July 9, 1973, abandoned. This application Apr. 9, 1975, Ser. No. 566,362

Claims priority, application South Africa, Aug. 4, 1972, 72/5371

Int. Cl.[2] C02C *1/06*

U.S. Cl. 210—7 18 Claims




1. A process for removing nitrogen from organic waste water containing nitrogenous compounds, which includes the steps of

a. feeding waste water to a first stage,

b. passing active sludge recycled from a subsequent stage of the process, to the first stage and inducing turbulence in the first stage for mixing the waste water and the active sludge to provide a mixed liquor, said first stage being a biological denitrification stage for allowing heterotrophic bacteria in suspension in the active sludge to convert nitrates to nitrogenous gases under anoxic conditions,

c. passing mixed liquor from the first stage to a second stage,

d. aerating the second stage to maintain aerobic conditions with a dissolved oxygen concentration of between 0.2 and about 6 mg/l, to obtain biological nitrification of nitrogenous compounds to nitrates by nitrifying bacteria contained in the active sludge in the mixed liquor,

e. recycling mixed liquor containing nitrates formed in the second stage to the first stage at an average daily rate of at least 0.8 by volume of the rate of feed of waste water fed to the first stage,

f. providing a sufficient residence time of mixed liquor in the first stage in relation to the respiration rate of bacteria in the active sludge in the first stage, to obtain denitrification of at least 80% by weight of the nitrates in the mixed liquor recycled to the first stage,

g. passing mixed liquor from the second stage to a third stage and inducing turbulence in the third stage, while allowing a sufficient residence time of the mixed liquor in the third stage for endogenous respiration of bacteria in the active sludge, to reduce any oxygen in the mixed liquor and then reduce nitrates to nitrogen gas to remove at least 60% by weight of the nitrates in the mixed liquor entering the third stage from the second stage,

h. passing mixed liquor from the third stage to a solids separation stage to provide a clarified effluent and an active sludge having a concentrated suspension of bacteria,

i. withdrawing clarified effluent from the solids separation stage,

j. recycling at least a portion of the active sludge from the solids separation stage to the first stage to provide the recycled active sludge in the first stage, the active sludge being recycled at a sufficient rate to maintain suspended solids concentration in the mixed liquor of at least about 1,000 mg/l in the first, second and third stages, and

k. wasting sludge at a daily rate of less than 16% by weight of the weight of the sludge in all the stages of the process

so as to ensure a sufficient residence time of nitrifying bacteria in the second stage, in relation to their growth rate, to prevent washing out of the nitrifying bacteria at a rate faster than their growth rate.

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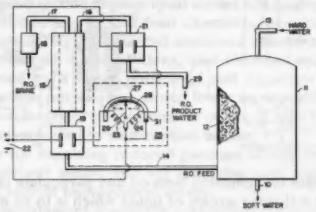
## 3,964,999
## DETERMINATION OF SODIUM FORM WATER SOFTENER BREAKTHROUGH

David M. Chisdes, Wayne, N.J., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Continuation of Ser. No. 398,662, Sept. 19, 1973, abandoned. This application Apr. 11, 1975, Ser. No. 567,367
Int. Cl.² B01D *13/00*
U.S. Cl. 210—23 R 15 Claims




1. A method of determining the relative exhaustion of a sodium form water softener which comprises the steps of:
measuring the conductivity of a sample of the outflow of the water softener;
removing sodium and hardness ions from the sample at different rates downstream of said measuring;
measuring the conductivity of the sample downstream of said removal;
determining the ratio of said measurements; and
determining said relative exhaustion from changes in said ratio.

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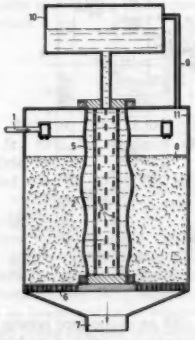
## 3,965,000
## METHOD FOR OPERATING ION EXCHANGE COLUMNS

Jiri Mikule, and Hans Georg Schneider, both of Euskirchen, Germany, assignors to Industrial Filter & Pump Mfg. Co., Cicero, Ill.

Continuation of Ser. No. 307,102, Nov. 16, 1972, abandoned. This application Aug. 26, 1974, Ser. No. 500,568
Int. Cl.² B01D *15/00*
U.S. Cl. 210—24 5 Claims



1. A method of maintaining a constant head of expandable granular material in a column through which a liquid to be treated is passed, said granular material being ion exchange resin which expands when used to treat said liquid, comprising the steps of vertically mounting a resilient, imperforate, deformable tubular member in said column to provide a first compartment within said member and a second compartment surrounding said member, partially filling one of said compartments with said granular material so as to leave an open space above said granular material in said one of said compartments, completely filling the other of said compartments with liquid, providing a closed liquid reservoir chamber above said column, partially filling said reservoir chamber with liquid connecting the top of said other compartment to a location in said reservoir below the liquid level therein, connecting said space in said one compartment above said granular material to a location in said reservoir chamber above said liquid level, and passing the liquid to be treated through said one of said compartments, whereby expansion of said granular material deforms said tubular member to force liquid up into said reservoir to maintain a constant head in said column.

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## 3,965,001
## PROCESS FOR REMOVING DISPERSED MATTER FROM WATER

Cyrus A. Irani, Clark, and Daniel J. McHugh, Edison, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Feb. 12; 1973, Ser. No. 331,864
Int. Cl.² C02C *9/02*
U.S. Cl. 210—28 3 Claims

1. A process for removing dispersed oil from sea water which comprises:
a. dissolving strontium hydroxide in sea water to precipitate a flocculated strontium carbonate salt,
b. adsorbing said oil on said flocculated salt,
c. providing additional oil in said sea water,
d. adsorbing said oil-adsorbed flocculated salt on said additional oil, and
e. separating said additional oil along with said oil-adsorbed flocculated salt.

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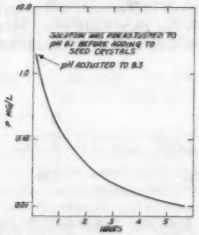
## 3,965,002
## PROCESS FOR REDUCING DISSOLVED INORGANIC ORTHOPHOSPHATES TO PPB LEVELS IN AQUEOUS SYSTEMS

Lawrence B. Magnusson, Langhorne, Pa., assignor to Betz Laboratories, Inc., Trevose, Pa.

Continuation of Ser. No. 564,582, April 2, 1975, abandoned, which is a continuation-in-part of Ser. No. 456,720, April 1, 1974, abandoned. This application Nov. 12, 1975, Ser. No. 631,335
Int. Cl.² C02C *1/40*
U.S. Cl. 210—46 8 Claims




1. A method for the continuous removal of dissolved orthophosphate from an aqueous medium which comprises:
i. Adding to water containing a known amount of dissolved orthophosphate an amount of soluble calcium such that the molar ratio of calcium to phosphorus is at least about

1.5, plus at least about 8 milligrams per liter of calcium in excess of said amount,

ii. Maintaining the pH of said water between 8.5 and 9.5,

iii. Maintaining the temperature of the water at or below 30°C,

iv. Allowing the dissolved orthophosphate to nucleate and to begin precipitating in the form of calcium phosphate solid,

v. Charging a reactor region with a slurry of the calcium phosphate solid obtained in step (iv),

vi. Introducing into the region a continuous flow of the aqueous medium to be treated,

vii. Maintaining the pH in the region between about 9.3 and about 10.5,

viii. Maintaining the soluble calcium content of the water within the reactor region at a level where the calcium to influent phosphorus molar ratio is at least about 1.5 plus at least about 0.2 millimoles calcium per liter excess,

ix. Establishing a steady-state of approximately constant concentration of soluble phosphate by maintaining the ratio of the phosphate input rate to charged calcium phosphate solid amount at about $1.5 \times 10^{-3}$ or less, where the input is expressed as moles of phosphorous per liter of reactor volume per minute and the charged calcium phosphate solid amount is expressed as moles of phosphorous per liter of reactor volume whereby additional orthophosphate in the form of calcium phosphate solid particles is precipitated, and

x. Separating the calcium phosphate solid particles from a reactor region effluent.

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**3,965,003**

## SCALE INHIBITION AND COMPOUNDS THEREFOR

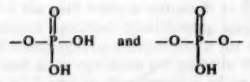
**James R. Stanford, Sugar Land, and Paul G. Vogelsang, Jr., Houston, both of Tex., assignors to Nalco Chemical Company, Oak Brook, Ill.**

**Continuation of Ser. No. 121,136, March 4, 1971, abandoned, which is a continuation of Ser. No. 879,940, Nov. 25, 1969, Pat. No. 3,617,578. This application Mar. 31, 1975, Ser. No. 563,304**

**Int. Cl.² C02B 5/06**

**U.S. Cl. 210—58** **10 Claims**

1. A process for preventing scale deposits of calcium, barium or magnesium salts or mixtures thereof from water containing said scale-forming chemicals which comprises adding to said water an effective scale inhibiting amount of a water soluble phosphate ester of at least one oxypropylated hydroxy hydrocarbon in which the phosphate ester groups consit essentially of one or both of a member selected consist the group consisting of



said oxypropylated hydroxy hydrocarbon being obtained solely by the addition of propylene oxide to a hydroxy hydrocarbon having only hydroxy groups attached to hydrocarbon groups and containing not more than 30 moles of propylene oxide per mole and said phosphate ester being obtained by reacting said oxypropylated hydroxy hydrocarbon with a compound from the group consisting of polyphosphoric acid, phosphorus pentoxide, and mixtures of polyphosphoric acid and phosphorus pentoxide.

**3,965,004**

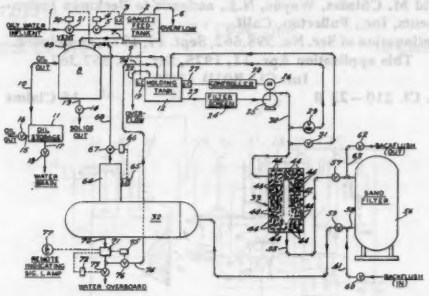
## REMOVAL OF CONTAMINANTS FROM WATER

**Daniel C. Garber, Overbrook Hills, Pa., assignor to Sun Shipbuilding & Drydock Company, Chester, Pa.**

**Continuation-in-part of Ser. No. 305,630, Nov. 10, 1972, abandoned. This application Jan. 30, 1975, Ser. No. 545,640**

**Int. Cl.² C10G 43/04**

**U.S. Cl. 210—73 W** **9 Claims**



1. A system for removing both oil and particulate contaminants from a flowing stream of liquid which is to be disposed of as waste, which comprises in sequence, a dewaxer consisting of a fixed bed containing a plurality of discrete bodies of a porous ceramic material compacted together in random arrangement as a packing which acts to constrain said flowing stream back and forth through said compacted ceramic material and to absorb waxes, asphalts, and like hydrocarbon materials, means to remove particulate matter, and a fine hole size coalescer operating to effect a separation of dispersed fine droplets of oil from said flowing stream.

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**3,965,005**

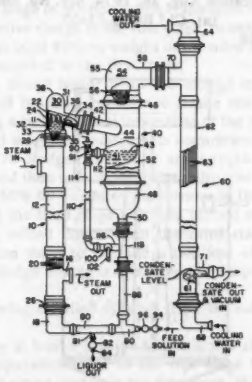
## METHOD AND APPARATUS FOR EVAPORATING AND SEPARATING MULTIPLE COMPONENT SOLUTIONS OR MIXTURES

**Lawrence C. Boyd, Jr.; Everett F. Kelm, both of Corning, N.Y., and John C. Randall, Blacksburg, Va., assignors to Corning Glass Works, Corning, N.Y.**

**Filed Nov. 22, 1974, Ser. No. 526,215**

**Int. Cl.² B01D 1/12**

**U.S. Cl. 210—96 R** **5 Claims**



1. In combination with an evaporator system for separating vapor and liquor components from a multiple component liquid, including vertical shell and tube evaporator means for forming streams of vapor and entrained liquor from a multiple component liquid, said evaporator means having a feed chamber at a lower end thereof for receiving said multiple compo-

nent liquid, first impingement means connected to an upper end of said evaporator means for separating a first liquor portion from said streams, second impingement means communicating laterally with said first impingement means for separating a second liquor portion from said streams, and conduit means for mixing said first and second liquor portions with the multiple component liquid supplied to said feed chamber of said evaporator means, the improvement which comprises,

said second impingement means includes a separator pot having a vertical cylindrical surface provided with an opening connected to an inlet conduit, said inlet conduit communicating with said first impingement means and having a longitudinal axis off-set with respect to the axis of said cylindrical surface;

liquor receiving chamber means, communicating with said first and second impingement means and having an outlet positioned above said feed chamber, for receiving and accumulating a substantial combined volume of said first and second liquor portions, said chamber means being formed by a lower portion of said separator pot, said separator pot having a closed lower section connected to said cylindrical surface and an outlet in said closed section connected to said conduit means;

means for supplying reduced pressure to said second impingement means and for removing said streams from said second impingement means;

mesh entrainment means for separating a third liquor portion from said streams, said mesh entrainment means comprising a housing connected to the upper end of said vertical cylindrical surface, a mesh entrainment separator pad secured within said housing above the confines of said cylindrical surface, and means extending from said housing and connected to said means for supplying reduced pressure to said second impingement means for removing said streams from said second impingement means and thereby drawings said streams through said mesh entrainment separator pad and providing an essentially pure vapor portion; and,

drain means for intermittently draining said chamber means, said drain means including probe means for sensing the level of liquor within said liquor receiving chamber means, valve means actuated by said probe means for regulating the supply of multiple component liquid to said evaporator feed chamber and for maintaining the upper surface level of said combined volume of liquor portions within said liquor receiving chamber means at a generally constant average height, and pressure sensitive means communicating with a lower portion of said liquor receiving chamber means for actuating the draining of said chamber means in response to the obtainment of a predetermined density of said combined volume of liquor portions, thereby providing a liquor component of a selected concentration.

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**3,965,006**

## LIQUID WASTE DISPOSAL

**George Otte, Jr., Erie, Pa., assignor to American Sterilizer Company, Erie, Pa.**

**Filed Nov. 12, 1974, Ser. No. 523,045**

**Int. Cl.[2] C02B 1/40**

**U.S. Cl. 210—138** **19 Claims**

1. An improved disposal unit for disposing of contaminated or potentially contaminated liquid or semi-liquid waste in manner designed to protect personnel and the environment from contamination comprising a conical open top chamber terminating at its lower end in an integral fitting,

means on said fitting adapted to connect set fitting to a trap,

vent means connected to the upper part of said chamber, a cover,

hinge means connecting said cover to said chamber, nozzle means,

shaft means supporting said nozzle means on the lower side of said cover,

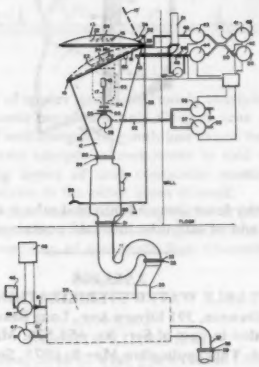
and said shaft means comprising,

a shaft rotatably supported on said cover at the center of the inside thereof and extending downwardly therefrom,

a hollow arm supported on said shaft and disposed generally perpendicular thereto,

holes in said arms, the ends of said arms having said nozzles supported thereon,

said nozzle means being supported on the end of said hollow arms whereby said nozzles rotate said arms,



and valve means connected to said hinge means and to said nozzle means for connecting fluid to said nozzle means and fluid supply means connected to said valve means whereby the inside of said chamber is sprayed by liquid from said nozzle means,

a shaft rotatably supported on said cover at the center of the inside thereof and extending downwardly therefrom,

a hollow arm supported on said shaft and disposed generally perpendicular thereto,

holes in said arms, the ends of said arms having said nozzles supported thereon,

said nozzle means being supported on the end of said hollow arms whereby said nozzles rotate said arms.

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**3,965,007**

## PROTEIN SKIMMER

**Arnold Conn, 253 West End Ave., Manhattan Beach, N.Y. 11235, and Harvey K. Cohen, 400 Cozine Ave., Brooklyn, N.Y. 11207**

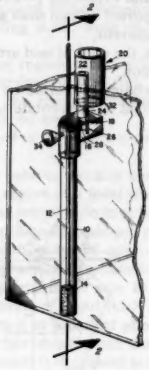
**Filed Sept. 17, 1973, Ser. No. 397,639**

**Int. Cl.[1] E04H 3/20**

**U.S. Cl. 210—169** **6 Claims**

1. Aquarium foam removal means in combination with an aquarium air lift water recirculating system, said system comprising a vertical air lift conduit with an inlet near the bottom thereof and air discharge means within said conduit near the bottom thereof, a horizontal conduit section with a first end in fluid communication with the upper end of said vertical conduit and an opposite open end for discharge of fluid therefrom, said foam removal means comprising baffle means arranged in said horizontal conduit section, a vertically arranged tube with an open upper end and a lower end connected to the horizontal conduit section and constructed and arranged to receive foam directed interiorly thereof by said baffle means, container means with sidewalls and a closed bottom and an

open upper end, said container bottom located above said horizontal conduit section and said sidewalls surrounding said



tube whereby foam directed into said tube is discharged from the upper end of said tube into said container.

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**3,965,008**

**PORTABLE WATER STERILIZATION DEVICE**

**Gerald C. Dawson, 391 Silvera Ave., Long Beach, Calif. 90814**

**Continuation-in-part of Ser. No. 451,576, March 15, 1974, abandoned. This application May 8, 1975, Ser. No. 575,485**

**Int. Cl.² B01D *21/00***

**U.S. Cl. 210—192** **7 Claims**

1. A portable device for use in transforming harmful bacteria contaminated water into potable water, said device including a plurality of components that are removably connected to one another and that may be separated and stored in a compact space when said device is not in use, said device including:

a. a tank in which said harmful bacteria contaminated water may be placed, said tank including a bottom in which a water discharge opening is defined, and a tubular boss extending outwardly from said bottom and in communication with said water discharge opening;

b. a plurality of legs each of said legs including first and second end portions;

c. first means for removably securing said legs to said tank to support the latter at an elevated position above the surface on which said legs rest;

d. an inverted L-shaped tubular member that has first and second legs;

e. second means for removably securing said first leg to said tubular boss;

f. a manually actuatable valve secured to said second leg, said valve capable of being manually adjusted to permit water from said tank to flow by gravity through said tubular member at not greater than a predetermined rate and discharge from said valve;

g. two laterally spaced, oppositely disposed elongate electrodes situated in said L-shaped member at a position intermediate the ends thereof, with said electrodes electrically insulated from one another; and

h. third means for supplying alternating electric power to said electrodes at a voltage potential sufficient to kill said harmful bacteria in said water when the latter flows between said electrodes in said tubular member at not greater than said predetermined rate, with said legs, L-shaped tubular members and valve of such dimensions as to be storable within said tank when said device is not in use.

**3,965,009**

**APPARATUS FOR BIOLOGICAL PURIFICATION OF AN EFFLUENT**

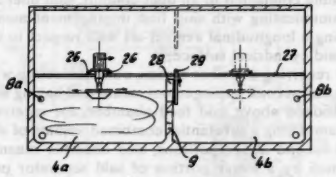
**Joseph Richard Kaelin, Villa Seeburg, CH-6374 Buochs, Switzerland**

**Filed Aug. 19, 1974, Ser. No. 498,410**

**Claims priority, application Switzerland, Aug. 23, 1973, 12108/73**

**Int. Cl.² C02C *1/10***

**U.S. Cl. 210—218** **1 Claim**



1. An apparatus for biological purification of an effluent comprising:

two identical basins sealed gas-tight at the top portion thereof and having a common wall, said common wall being provided with through passages interconnecting said basins;

means for feeding said effluent to be purified alternately to one or the other of said basins;

means for discharging purified water alternately from one or the other of said basins;

control means for said feeding and discharging means operative to feed effluent to the one of said basins and to discharge purified liquid from the other of said basins and alternately to feed effluent to the other of said basins and to discharge purified liquid from said one of said basins, whereby when the activated sludge concentration in the one basin drops below a certain level, the direction of operation is changed, so that the other basin functions as the activated sludge basin and the said one of said basins functions as the final purification basin connected in series;

aeration impeller means for enriching said effluent with oxygen or an oxygen mixture and for agitating said effluent in the respective basin operating as the activated sludge basin, said impeller means comprising a double-sided impeller having an oxygen supply line extending into one of the intake openings of said impeller;

a vertically movable slide in the upper region of said common wall for opening and closing a passage in the upper end thereof;

rail and roller means for reciprocally supporting said aeration impeller means on said basins and for slidably moving said aeration impeller means through said moveable slide passage between said basins for disposing the same in operative relation with the respective basin operating as the activated sludge basin; and

means for removing excess oxygen from the upper region of said basins.

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**3,965,010**

**METAL FILTER FOR MELT SPINNING PACKS**

**William Lewis Phillips, Jr., Wilmington, and Ernest Alan Uebler, Newark, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

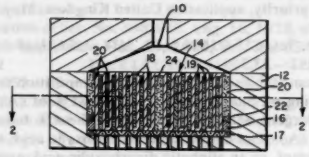
**Filed Feb. 4, 1975, Ser. No. 547,018**

**Int. Cl.² B01D *23/10***

**U.S. Cl. 210—283** **1 Claim**

1. A filter comprising a sintered porous metallic structure having upper and lower surfaces and concentric grooves alternately in communication with said upper and lower surfaces; granular material within said grooves; and means for retaining

said granular material in said grooves, said sintered porous metallic structure and said granular material comprising irregularly shaped particles formed from a metal alloy consisting essentially of about 30 percent to about 40 percent by weight



chromium; about 2 percent to about 4 percent by weight silicon; 100 to 400 parts per million by weight carbon and 600 to 1000 parts per million by weight nitrogen; and the remainder iron.

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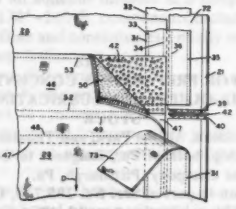
**3,965,011**

## ENDLESS FILTER BELT

**John A. Sheaffer, Norwalk, Conn., assignor to Dorr-Oliver Incorporated, Stamford, Conn.**

**Filed May 5, 1975, Ser. No. 575,031**
**Int. Cl.² B01D *33/14***
**U.S. Cl. 210—400** **13 Claims**



1. Endless filter belt for a rotary vacuum drum filter which comprises a strand of filter media having longitudinal edge portions and transverse end portions,

a first pair of pile fiber fabrics fastened to respective faces of one end portion of said strand, in back-to-back relationship, and thus constituting with said filter media a prepared straight end portion of said stand,

a pair of flaps provided on the opposite end portion of said strand of filter media,

a second pair of pile fiber fabrics fastened to respective inner faces of respective flaps, and in face-to-face relationship, adapted to receive between them said prepared straight end portion of said strand, and to separably interlock with the pile fibers of said straight end portions, for transmitting shearing stresses resulting from the longitudinal pull of the filter belt.

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**3,965,012**

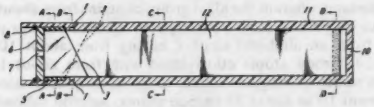
## MEMBRANE SEPARATION APPARATUS

**Tamiyuki Eguchi, and Satoshi Imai, both of Kobe, Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan**

**Filed Dec. 11, 1974, Ser. No. 531,476**
**Claims priority, application Japan, Dec. 11, 1973, 48-140901**
**Int. Cl.² B01D *31/00***
**U.S. Cl. 210—433 M** **9 Claims**

1. A membrane separation apparatus adapted for use in ultrafiltration having a casing, a stacked membrane unit enclosed therein, a feed inlet, a concentrate outlet and an effluent outlet, said stacked membrane unit comprising:

a. a continuous composite membrane folded flatly in zigzag relation to form a plurality of stacked layers defining a plurality of outer flow channels for feed liquid in alternately interleaving pockets formed by said layers, said composite membrane being made of a flexible porous support and having a pair of selectively permeable membranes on opposite outer surfaces thereof and inner flow channels for effluent positioned between and separated from said outer flow channels by said selectively permeable membranes;



b. a plurality of spacer means alternately overlying layers of said composite membrane only along an area adjacent to one end of said composite membrane to seal between said layers of said composite membrane in said area while maintaining layers of said composite membrane in a spaced position in the other areas thereof;

c. said composite membrane being sealed at its peripheral edges except said end and defining, when folded, a serpentining opening of said inner flow channels exposing said end.

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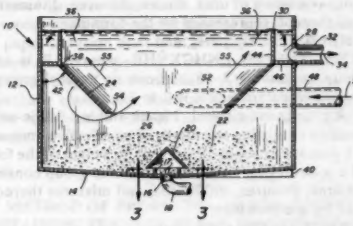
**3,965,013**

## GRAVITY CLARIFIER

**George F. Jackson, 5745 E. 47th Place, Tulsa, Okla. 74135**

**Filed Oct. 31, 1974, Ser. No. 519,526**
**Int. Cl.² B01D *21/26***
**U.S. Cl. 210—519** **6 Claims**



1. A gravity clarifier for separating solids from liquid, comprising;

a large diameter circular cylindrical open top tank having a closed bottom;

a downwardly depending truncated conical shell attached at its large end to the tank wall;

an axial circular trough near the top end of said tank and a weir for the overflow of effluent liquid into said trough, the upper portion of the tank between said conical shell lower end and said overflow weir providing a quiescent gravity settling zone;

influent conduit means entering said tank tangentially below the large end of said truncated conical shell, the lower portion of the tank between the shell lower end and the tank bottom providing a swirling sludge bed directly beneath the quiescent settling zone; and

means for the removal of the settled sludge from said tank bottom near the center of said tank bottom.

3,965,014

## ANIONIC FABRIC CONDITIONERS

Annie Sue Giordano, Piscataway, N.J.; Richard Lerda Burke, San Diego, Calif., and Harold Eugene Wixon, New Brunswick, N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Filed Dec. 7, 1972, Ser. No. 311,720
Int. Cl.² D06M *13/20*
U.S. Cl. 252—8.7 3 Claims

1. A fabric conditioning composition comprising a dimethylpolysiloxane polymer, water, and an anionic surfactant having a derivable pH of about 7–9 selected from the group consisting of alkyl benzene sulfonates wherein the alkyl group contains from about 10 to about 20 carbon atoms, alkyl toluene sulfonates wherein the alkyl group contains from about 10 to about 20 carbon atoms, ethoxylated alcohol sulfates produced from an aliphatic alcohol having from about 10 to about 20 carbon atoms ethoxylated with from about 1 to about 6 moles of ethylene oxide, soaps of fatty acids having from about 10 to about 20 carbon atoms, paraffin sulfonates having from about 10 to about 20 carbon atoms, N-(2-hydroxyalkyl)-amino acids having from 10 to 20 carbon atoms in the alkyl chain, and mixtures thereof.

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3,965,015

## BLEACH-RESISTANT FABRIC SOFTENER

Robert Andrew Bauman, New Brunswick, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 277,097, Aug. 1, 1972, abandoned. This application Sept. 19, 1974, Ser. No. 507,508
Int. Cl.² C11D *1/50*; D06M *13/40*
U.S. Cl. 252—8.8 17 Claims

1. A bleach-stable, cleaning and fabric-softening composition comprising from 2 to 75 percent by weight of a detergent selected from the group consisting of anionic, nonionic, cationic, ampholytic and zwitterionic detergents, and an effective amount of from about 1 percent to about 20 percent based on the weight of said detergent of a softening agent selected from the group consisting of urea, diurea, thiourea, dithiourea, and mixtures thereof, represented by the formulae:

1. $RNHCXNH(CH_2)_nNH_2$, and
2. $RNHCXNH(CH_2)_nNHCXNHR$, wherein R is an alkyl group containing 2–18 carbons or an aryl group, X is oxygen or sulfur, and *n* is 2 to 12.

10. An aqueous-alcohol bleach-stable, fabric-softening composition consisting essentially of an effective amount from about 1 percent to about 20 percent by weight of the formulation of a softening agent selected from the group consisting of urea, diurea, thiourea, dithiourea, and mixtures thereof, represented by the formulae:

1. $RNHCXNH(CH_2)_nNH_2$, and
2. $RNHCXNH(CH_2)_nNHCXNHR$, wherein R is an alkyl group containing 2–18 carbons or an aryl group, X is oxygen or sulfur, and *n* is 2 to 12.

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3,965,016

## COMPLEX ANTIMONY SULFIDES AS LUBRICANT ADDITIVES

John Richard Soulen, Narberth, Pa., assignor to Pennwalt Corporation, Philadelphia, Pa.

Filed May 27, 1975, Ser. No. 580,859
Int. Cl.² C10M *1/10, 3/02, 5/02, 7/02*
U.S. Cl. 252—25 2 Claims

1. Lubricating compositions containing from about 1 to 60% by weight a complex sulfide of antimony represented by the formula $Sb_aS_b$ where *a* is within the range of about 1.7 to 2.3 and *b* is within the range of about 3.6 to 4.4.

3,965,017

## LUBRICATING OIL COMPOSITIONS

Victor Charles Ernest Burnop, and Ronald Charles Watkins, both of Wantage, England, assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed May 12, 1975, Ser. No. 576,968
Claims priority, application United Kingdom, May 17, 1974, 22085/74
Int. Cl.² C10M *1/40, 3/34, 1/54, 3/48*
U.S. Cl. 252—33.3 17 Claims

1. A foam stabilised lubricating oil composition comprising a lubricating oil base, from 0.01 to 20 wt.% of (A) an overbased detergent additive, (B) 0.1 to 15 wt.% based on the weight of (A) of an aliphatic monocarboxylic acid, anhydride or salt thereof, or an aliphatic dicarboxylic acid, anhydride or salt thereof, said acid, anhydride or salt having at least 30 carbon atoms per molecule or the reaction product of a phosphorus sulphide with a hydrocarbon and (C) a dihydric alcohol having 2,3 or 4 carbon atoms per molecule, or a di- or tri-($C_2$–$C_4$) glycol or an ether alcohol having 2 to 10 carbon atoms per molecule.

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3,965,018

## PROCESS FOR PREPARING A CONCENTRATE OF A POLYALPHA-OLEFIN IN A LUBRICATING OIL BASE STOCK

William J. Heilman, Allison Park, and Thomas J. Lynch, Harmar Township, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 205,720, Dec. 7, 1971, abandoned. This application June 12, 1974, Ser. No. 478,780
The portion of the term of this patent subsequent to Apr. 15, 1992, has been disclaimed.
Int. Cl.² C10M *1/16*
U.S. Cl. 252—59 9 Claims

1. The method for making a concentrate of a poly(1-alkene) in a lubricating oil base stock for use as an additive in preparing multiviscosity graded motor oils which comprises

conditioning a hydrotreated mineral lubricating oil base stock having a 210° F. viscosity between about two cs. and about eight cs., by contacting it with a first Ziegler-Natta catalyst comprising a compound of a transition metal from Groups IV-B, V-B, VI-B or VIII at a valence state less than its maximum valence state and an organometallic compound of a Group II or III metal and hydrogen at a pressure between about one and about 150 psia. at a temperature between about −10° C. and about 125° C. for about 30 seconds to about one hour, using from about 0.01 to about 20 grams of said catalyst per liter of said hydrotreated lubricating oil base stock and a ratio of gram atoms of Group II or Group IIII metal to gram atoms of the transition metal of from about 1:1 to about 10:1, and

contacting a 1-alkene reactant comprising about 70 to 100 mol percent of a 1-alkene having from six to 12 carbon atoms or a mixture thereof and 0 to about 30 mol percent of a 1-alkene having from 16 to 20 carbon atoms or a mixture thereof with a second Ziegler-Natta catalyst in the presence of about 10 to about 300 parts of the said conditioned hydrotreated lubricating oil base stock as a reaction medium per 100 parts of said 1-alkene reactant at polymerization conditions.

## 3,965,019
## LUBRICATING COMPOSITIONS CONTAINING HYDROGENATED BLOCK COPOLYMERS AS VISCOSITY INDEX IMPROVERS

**David J. St. Clair, Bethalto, Ill., and Ronald K. Crossland, Manhattan Beach, Calif., assignors to Shell Oil Company, Houston, Tex.**

**Continuation of Ser. No. 388,875, Aug. 16, 1973, abandoned. This application Dec. 19, 1974, Ser. No. 534,256**
**Int. Cl.² C10M 1/16**
**U.S. Cl. 252—59** **3 Claims**

1. A lubricating composition comprising a major proportion of a petroleum lubricating oil and from about 0.1% to about 10% by weight of a selectively hydrogenated block copolymer having the structure

polystyrene-hydrogenated polyisoprene wherein at least 98% of the olefinic double bonds present in the non-hydrogenated precursor of said polymer are reduced by hydrogenation, at least 20% of the polymer chains containing no in-chain olefinic unsaturation.

## 3,965,020
## SILICEOUS THERMAL INSULATION AND METHOD OF MAKING SAME

**Charles H. Noll, Athens, Ga., and James B. Andrews, Zion, Ill., assignors to Johns-Manville Corporation, Denver, Colo.**

**Filed Sept. 20, 1973, Ser. No. 399,229**
**Int. Cl.² C04B 43/02, 43/06, 43/12**
**U.S. Cl. 252—62** **16 Claims**

1. A method of forming a shaped predominately siliceous thermal insulation which consists essentially of

a. mixing in an aqueous medium at a temperature in the range of 170°–210°F. components including no natural inorganic fiber and consisting essentially of

60–85 wt. % diatomite powder
5–10 wt. % hydrated lime
8–14 wt. % clay and
1–8 wt. % synthetic fibers;

b. allowing the mixed components to stand for a period of 0.5–2.0 hours at a temperature in the range of 150°–200°F.;

c. molding the desired shape, and

d. drying said shaped siliceous thermal insulation.

13. A predominately siliceous shaped article containing no natural inorganic fiber and consisting essentially of the product of the reaction of

60–85 wt. % diatomite powder
5–10 wt. % hydrated lime
8–14 wt. % clay and
1–8 wt. % synthetic fiber and produced by a process consisting essentially of mixing in an aqueous medium at a temperature in the range of 170°–210°F., being allowed to stand for a period of 0.5–2.0 hours at a temperature of 150°–200°F., and then being molded to shape and dried.

## 3,965,021
## ELECTROSTATOGRAPHIC TONERS USING BLOCK COPOLYMERS

**Carl F. Clemens, Webster, and M. James Lenhard, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

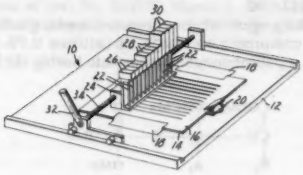
**Continuation-in-part of Ser. No. 524,371, Jan. 14, 1966, abandoned. This application Sept. 15, 1970, Ser. No. 72,548**
**Int. Cl.² G03G 9/00**
**U.S. Cl. 252—62.1 P** **6 Claims**

1. Finely-divided electrostatographic dry toner particles consisting essentially of a resinous material and from 1 (up) to about 25% of a colorant selected from the group consisting of dyes, pigments, and mixtures thereof based on the weight of said toner particles, said resinous material consisting essentially of a polyblend of at least 10% by weight of a first polymer having a glass transition temperature of at least about 20°C and at least 10% by weight of a second polymer having a glass transition temperature of at least about 5°C lower than the glass transition temperature of said first polymer, said polyblend consisting essentially of (comprising) a block copolymer of said first and second polymers.

## 3,965,022
## PRESSURE-FIXABLE DEVELOPING POWDER

**Doyle L. Strong, West Lakeland Township, Washington County, and Curtis Dale Hargadine, Hastings, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed June 29, 1973, Ser. No. 375,115**
**Int. Cl.² G03G 9/00**
**U.S. Cl. 252—62.1 P** **7 Claims**




1. Flowable, pressure-fixable, dry powder particles, the binder material of said particles having a conductivity of at most $10^{-12}$ mho/cm., said binder comprising (a) about 74 to 98 parts by volume of a thermoplastic component having a softening point of at least about 60°C., a 10-second shear creep compliance in the range of about $1 \times 10^{-12}$ cm²/dyne to $1 \times 10^{-10}$ cm²/dyne, and a heat deflection temperature below about 300°C., and (b) about 2 to 26 parts by volume of a non-volatile component having a principal glass transition temperature below about 0° C. and a 10-second shear creep compliance greater than about $8 \times 10^{-8}$ cm²/dyne; wherein said powder exhibits a transfer density of less than about 0.15 and a paper abrasion density of less than about 0.15; wherein said non-volatile component is an elastomer selected from the group consisting of synthetic diene rubbers, acrylate rubbers, polyurethane elastomers, and rubbery block copolymers; and wherein said binder further comprises a tackifier for said elastomer.

## 3,965,023
## METHOD OF PRODUCING LIQUID TONERS CONTAINING FURNACE BLACK FOR DEVELOPING ELECTROSTATIC IMAGES

**Bheema Rao Vijayendran, Bethel, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.**

**Filed Sept. 24, 1974, Ser. No. 508,819**
**Int. Cl.² G03G 9/12**
**U.S. Cl. 252—62.1 L** **16 Claims**

1. In a method of producing a liquid toner, the steps comprising:

A. charging into a mill a furnace black having a particle size ranging from 15–100 milimicrons, a polymer which is soluble in a liquid hydrocarbon, and a first non-polar liquid hydrocarbon having a K.B. number between 25 and 35, an electrical resistivity of at least $10^9$ ohm-cm and a dielectric constant of less than 3.5;

B. mildly milling said ingredients for a period of 24–36 hours;

C. storing the milled ingredients to allow such ingredients to settle, thereby forming a sediment;

D. seperating the sediment which has settled during storage; and

E. mixing the sediment from the milled ingredients with a liquid hydrocarbon having said properties of said first liquid hydrocarbon.

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3,965,024

## WASHING AGENT COMPOSITIONS AND WASHING ASSISTANT COMPOSITION CONTAINING PHOSPHONOPOLYCARBOXYLATE SEQUESTERING AGENTS

Edmund Schmadel, Mettman; Günter Jakobi, Hilden; Karl-Heinz Worms, and Helmut Blum, both of Dusseldorf-Holthausen, all of Germany, assignors to Henkel & Cie G.m.b.H., Dusseldorf-Holthausen, Germany

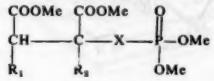
Filed Nov. 21, 1973, Ser. No. 417,891

Claims priority, application Germany, Nov. 29, 1972, 2258301

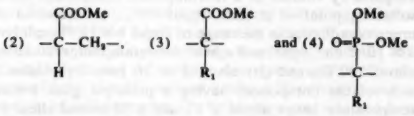
Int. Cl.² C11D *3/395*

U.S. Cl. 252—95 12 Claims

1. Washing agent compositions and washing assistant compositions comprising essentially of (a) from 0.5% to 70% by weight of a phosphonopolycarboxylate having the formula



wherein $R_1$ is a member selected from the group consisting of hydrogen and methyl, $R_2$ is a member selected from the group consisting of hydrogen, alkyl having 1 to 4 carbon atoms and $-CH_2-CHR_1-COOMe$, X is a member selected from the group consisting of (1) a direct bond between the carbon and the phosphorus,



and Me is a member selected from the group consisting of hydrogen and a cation capable of complex formation with alkaline earth metal ions, (b) from 0 to 96.5% by weight of customary non-surface-active ingredients for washing agents and (c) from 3% to 45% by weight of at least one surface-active compound selected from the group consisting of soaps, synthetic carboxylates, sulfates, sulfonates and nonionic polyglycol ethers, wherein the components are so selected that a 1% solution of said compositions has a pH of between 6 and 11.5 and the total content of phosphorus does not exceed 4% by weight.

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3,965,025

## METHOD FOR MANUFACTURING ALKALINE DETERGENTS AND DESINFECTANTS

Alojzy Klopotek, Nowy Dwor Mazowiecki; Jan Profic, Warsaw; Jerzy Uminski, Nowy Dwor Mazowiecki, and Gabriela Dziala, Legionowo, all of Poland, assignors to Instytut Chemii Przemyslowej, Warsaw, Poland

Filed Feb. 5, 1974, Ser. No. 439,758

Claims priority, application Poland, Feb. 7, 1973, 160632; Feb. 14, 1973, 160733

Int. Cl.² C11D *3/48*; C01B *25/00*

U.S. Cl. 252—106 7 Claims

1. A process for preparing alkaline polyphosphate complexes of the formula

$Me[PO_3ME]_x$-OH...Br-Br...HO-$[PO_3Me]_x$Me

wherein Me represents an alkali metal atom, and x is an integer of from 2 to 50, which comprises reacting one mole of a compound selected from a bromioodate ion, $[IBr_2]^-$ and a bromine-non-ionic surfactant complex with not more than 2 moles of a polyphosphate of the formula $Me[PO_3Me]_x$-OH, wherein Me and x are as defined above, at a temperature range of about 0°–50°C.

4. A process for preparing alkaline polyphosphate complexes of the formula

$Me[PO_3Me]_x$-OH...I-Br...HO-$[PO_3Me]_x$Me

wherein Me represents an alkali metal atom and x is an integer of from 2 to 50 which comprises reacting not more than one mole of a compound selected from iodine bromide and a bromine-iodine non-ionic surfactant complex with a polyphosphate of the formula $Me[PO_3Me]_x$-OH wherein Me and x are as defined above, at a temperature range of about 0°–50°C.

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3,965,026

## GERMICIDAL ALL-PURPOSE LIQUID CLEANER

Albert Jay Lancz, Piscataway, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 270,186, July 10, 1972, abandoned. This application Sept. 20, 1974, Ser. No. 507,840

The portion of the term of this patent subsequent to May 21, 1991, has been disclaimed.

Int. Cl.² C11D *1/10*, *1/62*, *3/48*

U.S. Cl. 252—106 4 Claims

1. An aqueous germicidal liquid cleaner which is stable, homogeneous and clear at temperatures between 30°F. and 120°F. consisting essentially of

1. from about 0.10% to about 15.0% by weight of a quaternary ammonium compound selected from the group consisting of trimethyl stearyl ammonium chloride, trimethyl cetyl ammonium chloride, dimethyl ethyl lauryl ammonium chloride and dimethyl propyl myristyl ammonium chloride,
2. from about 1.0% to about 25.0% by weight of nitrilotriacetic acid trisodium salt,
3. from about 0% to about 10.0% by weight of a polyethoxylate of a $C_{10}$–$C_{16}$ fatty alcohol having a mole ratio of combined ethylene oxide to said fatty alcohol of at least 5, and
4. the balance water.

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3,965,027

## SCALE INHIBITION AND CORROSION INHIBITION

Bennett P. Boffardi, Bethel Park; Michael M. Cook, McKees Rocks, and Paul H. Ralston, Bethel Park, all of Pa., assignors to Calgon Corporation, Pittsburgh, Pa.

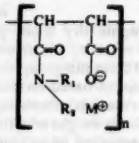
Filed Mar. 11, 1974, Ser. No. 450,029

Int. Cl.² C02B *5/00*

U.S. Cl. 252—180 8 Claims

1. A method of inhibiting corrosion and scale formation in an aqueous system comprising the step of treating the said system with 0.1 to 500 parts per million by weight of the total aqueous content of the said system, of a composition selected from the group consisting of:

a. polymers having recurring units of the formula:



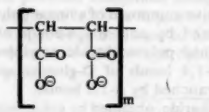
wherein $M^{\oplus}$ may be $H^{\oplus}$, alkali metal cation, or quaternary ammonium cation of the formula:

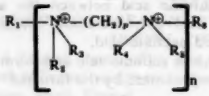
wherein for all of the above formulas, $R_1$, $R_2$, $R_3$, $R_4$, $R_5$, and $R_6$ are each independently selected from the group consisting of hydrogen, alkyl of from one to 10 carbon atoms, and substituted alkyl of from one to 10 carbon atoms, where the substituent is hydroxyl; carbonyl; and carboxylic acid groups, and alkali metal ion and ammonium salts thereof;

wherein $n$ is an integer of from 2 to 100, such that the polymer has a weight average molecular weight of from about 200 to about 10,000; and

wherein for the polymer the molar ratio of amine to maleic anhydride is from about 0.1 to about 2.0; and

b. polymers having recurring units of the formula:





wherein $R_1$, $R_2$, $R_3$, $R_4$, $R_5$, and $R_6$ have the same meaning as above;

wherein $p$ is an integer of from 1 to 6;

wherein $m$ is an integer of from 2 to 100; and

wherein $n$ is an integer of from 2 to about 100, such that the polymer has a weight average molecular of from about 200 to about 10,000, provided that, $n$ not equal to $m$, the lesser of $m$ or $n$ is multiplied by a factor such that $n = m$; and

wherein for the polymer the molar ratio of amine to maleic anhydride is from about 0.1 to about 2.0.

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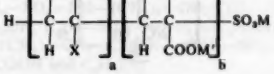
**3,965,028**

## BISULFITE TERMINATED OLIGOMERS TO PREVENT SCALE

**John T. O'Brien, Cheshire, and Woodrow W. Oxford; Oxford, both of Conn., assignors to Uniroyal Inc., New York, N.Y.**

**Filed July 31, 1974, Ser. No. 493,489**
**Int. Cl.² C02B 5/06**
**U.S. Cl. 252—180** **10 Claims**

1. A method of treating water to inhibit scale formation on surfaces of equipment in which the water is used comprising adding to the water, in an amount effective to inhibit scale formation, a bisulfite-terminated oligomer having the formula



wherein M is a water soluble cation; X is selected from the group consisting of —CN and —$COOCH_3$; M′ is selected from the group consisting of ammonium, amine, and alkali metal; a + b is from 4 to 250; and a/a+b is from 0.0 to 0.5.

**3,965,029**

## LIQUID CRYSTAL MATERIALS

**Sardari L. Arora, Kent, Ohio, assignor to Kent State University, Kent, Ohio**

**Filed Feb. 4, 1974, Ser. No. 439,046**
**Int. Cl.² C09K 3/34; G02F 1/13**
**U.S. Cl. 252—299** **6 Claims**

1. A liquid crystal material comprising a mixture of at least one Bis-(4′-n-alkoxybenzal) - 2-methyl-1, 4-phenylenediamine and 4-methylbenzal-4′-n-butylaniline.

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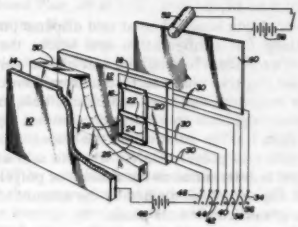
**3,965,030**

## LYOTROPIC NEMATIC LIQUID CRYSTALS FOR USE IN ELECTRO-OPTICAL DISPLAY DEVICES

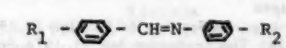
**Derick Jones, and Sun Lu, both of Dallas, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Division of Ser. No. 16,078, March 3, 1970, Pat. No. 3,690,745. This application Aug. 7, 1972, Ser. No. 278,302**
**Int. Cl.² C09K 3/34**
**U.S. Cl. 252—299** **5 Claims**



1. A mixed liquid crystal composition consisting essentially of a mixture of

a. a solvent having the general formula



wherein $R_1$ and $R_2$ are alkyl radicals having from 1 to 5 carbon atoms; and

b. a solute selected from at least one compound or a mixture of both compounds taken from the group of compounds consisting of

1. butyl - p - (p-ethoxyphenoxycarbonyl) phenyl carbonate, and
2. p - [N-(p-methoxybenzylidene) amino] phenyl acetate.

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**3,965,031**

## RED EMITTING PHOSPHORS

**Richard M. Klein, Framingham, and Natansohn Samuel, Sharon, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.**

**Filed May 19, 1975, Ser. No. 578,681**
**Int. Cl.² C09K 11/30**
**U.S. Cl. 252—301.4 R** **5 Claims**

1. A phosphor represented by the formula $Li_{1-x}Ca_{2x}Al_{3-x}O_5 : Fe^{+3}$ or $LiCa_{2x}Al_{9-2x}Si_2O_9 : Fe^{+3}$ wherein $0.005 \leq x \leq 0.25$ and the iron ($Fe^{+3}$) activator is present in about 0.001 to 0.013 moles/formula weight of said $Li_{1-x}Ca_{2x}Al_{3-x}O_5$ or said $LiCa_{2x}Al_{9-2x}Si_2O_9$.

## 3,965,032
## COLLOIDALLY STABLE DISPERSIONS

**Dale S. Gibbs; Robert D. Vandell, and Ritchie A. Wessling, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Apr. 16, 1973, Ser. No. 351,713**
**Int. Cl.² B01J *13/00*; C08F *15/02***
**U.S. Cl. 252—306** **11 Claims**

1. A colloidal dispersion containing as the surfactant material a stabilizing amount of a noncopolymerizable substantially linear interpolymeric interfacially spreading polyelectrolyte in both the disperse and continuous phase of said dispersion wherein:
   1. said polyelectrolyte is composed of a mixture of nonionic hydrophobic units and ionic hydrophilic units wherein said nonionic hydrophobic units are copolymerized ethylenically unsaturated monomers which when in the form of amorphous homopolymers are less than about 0.1 percent soluble in water and wherein said monomer has no substituent extending more than about 10 Angstrom units from the point of ethylenic unsaturation said units being randomly distributed in the backbone of said polyelectrolyte and wherein said ionic hydrophilic units are copolymerized ethylenically unsaturated ionic monomers which when in the form of amorphous homopolymers are soluble in water and wherein said ionic hydrophilic units remain substantially completely ionized over the entire pH range of 0 to 14,
   2. said polyelectrolyte is adsorbed at said disperse phase in a substantially flat configuration and where the area occupied by each ionic hydrophilic unit of said polyelectrolyte at the disperse phase surface is from about 60 to 100 square Angstrom units per hydrophilic unit, and
   3. said polyelectrolyte has an adsorption constant equal to or greater than 1 at the point where the disperse phase is saturated with said polyelectrolyte wherein said adsorption constant is determined as the amount of polyelectrolyte in said disperse phase divided by the amount of polyelectrolyte in said continuous phase.

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## 3,965,033
## PROCESS FOR THE PRODUCTION OF OIL-CONTAINING MICROCAPSULES

**Hiroharu Matsukawa, and Keiso Saeki, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan**

**Continuation-in-part of Ser. No. 166,563, July 27, 1971, Pat. No. 3,803,045. This application Jan. 31, 1974, Ser. No. 438,518**
**Claims priority, application Japan, July 27, 1970, 45-65650; July 31, 1970, 45-66894**
**The portion of the term of this patent subsequent to Apr. 9, 1991, has been disclaimed.**
**Int. Cl.² B01J *13/02***
**U.S. Cl. 252—316** **19 Claims**

1. A process for producing oil-containing microcapsules by coacervation, which comprises:
   1. dispersing a hydrophobic fine powder or emulsifying a hydrophobic liquid into an aqueous solution of at least one type of high molecular weight electrolytic colloid for use in forming the capsule wall;
   2. subjecting dispersion or emulsion obtained in Step (1) to water dilution, and/or pH adjustment to achieve coacervation and optionally, adding an aqueous solution of a high molecular weight colloid, if desired;
   3. cooling the formed coacervate to gel the same;
   4. adding a phenolic compound thereto at a temperature above 5°C., during Steps (2) and (3);
   5. adding a hardening agent to the system;
   6. adding a shock-preventing agent to the system at a temperature lower than the gelling point of gelatin, said shock-preventing agent being capable of preventing a rapid increase in the viscosity of the system during pre-hardening of the coacervate when the pH of the system approaches a value of no less than about 6;
   7. adjusting the pH of the system to the alkali side, said Steps (5) through (7) constituting the pre-hardening treatment; and
   8. optionally elevating the temperature of the system to more effectively harden the coacervate,

   the order of Steps (5) through (7) being capable of being freely modified with respect to each other, and Step (5) further being capable of being conducted prior to Step (4),

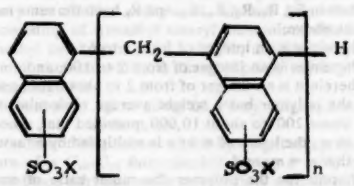
   said shock-preventing agent being present in an amount sufficient to prevent a rapid increase in viscosity during pre-hardening, when the pH of the system approaches a value of no less than about 6 and being a member selected from the group consisting of

   a modified cellulose comprising polysaccharides having $\beta$-1,4-glucoside bonds of glucoses and having anionic functional groups,

   an anionic starch derivative composed of a linear polysaccharide amylose formed by only $\alpha$-1,4-bonds of D-glucose, and a branched polysaccharide amylopectin formed by mainly $\alpha$-1,4 bonds of D-glucose and a partially side chain branched by $\alpha$-1,6 bonds,

   an anionic acid polysaccharide, obtained by polycondensing linearly D-galacturonic acid between the $\alpha$-1,4 bonds thereof, said acid polysaccharide containing pectin, pectic acid, and pectinic acid,

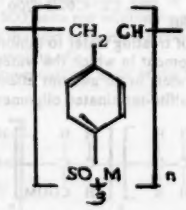
   a condensate of naphthalene sulfonic acid and Formalin, which condensate is represented by the formula:




   wherein X is a hydrogen atom, an alkali metal, or an ammonium group, and $n$ is a positive integer,

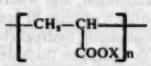
   a hydroxyethyl cellulose derivative selected from the group consisting of the carboxymethyl ether of hydroxyethyl cellulose, hydroxyethyl cellulose sulfate, and hydroxyethyl cellulose phosphate,

   a vinylbenzene sulfonate copolymer selected from the group consisting of a vinylbenzene sulfonate-acryloylmorpholine copolymer, a vinylbenzene sulfonate-morpholinoethylacrylamide copolymer, a vinylbenzene sulfonate acrylamide copolymer, a vinylbenzene sulfonate-vinylpyrrolidone copolymer, and a vinylbenzene sulfonatemethyloxy-methylacrylamide, said copolymer having the following group within its molecular structure:




   wherein M is an alkali metal and $n$ is a positive integer and, an acrylic acid copolymer selected from the group consisting of an acrylic acid-acryloylmorpholine co-

polymer, an acrylic acid-morpholinomethylacrylamide copolymer, an acrylic acid-acrylamide copolymer, an acrylic acid-vinylpyrrolidone copolymer, an acrylic acid-methoxymethylacrylamide copolymer, said copolymer having the following group within its molecular structure:



wherein X is a hydrogen atom or an alkali metal, and *n* is a positive integer,

a maleic acid copolymer of maleic acid anhydride and at least one monomer having at least one unsaturated bond which is subjected to addition polymerization with said anhydride or a salt thereof, and a nucleic acid compound,

said phenolic compound being present in an amount ranging from 1/500 to ¾ part by weight based on one part by weight of gelatin used to form the capsule wall,

at least one of the hydrophilic colloids employed being gelatin.

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## 3,965,034
## METHOD FOR BREAKING FOAMS AND APPARATUS USEFUL THEREFOR

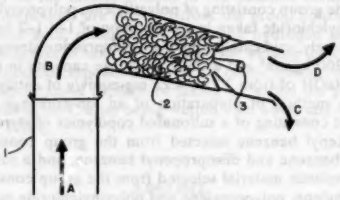
**Henri Roques, Portet, Gar, and Michel Roustan, Ramonville, both of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France**

**Filed Feb. 12, 1973, Ser. No. 331,691**

**Claims priority, application France, Feb. 29, 1972, 72.06865**

**Int. Cl.² B01D *19/00, 19/02***

**U.S. Cl. 252—321** **7 Claims**




1. A method for breaking foams of surface active agents or fermentation which comprises passing the foam to be broken through a packing material which is chemically inert with respect to the foam and which consists essentially of:

glass, plastic or metal having a coating thereon of a compound of formula

$CF_3-(CF_2)_n-X$

wherein *n* is a whole number between 3 and 9 and X is selected from the group of $C_2H_4-SO_3-C_4H_9$; $C_2H_4-SO_3H$; $C_2H_4-SO_3H_2$, $(C_2H_5)_3N$; $C_2H_4-SO_2-NH_2$; $(C_2H_4)_2-COOH$; $(C_2H_4)_2-COOH$; $C_2H_3Cl-O-PO_3H_2$; $C_2H_3Cl-O-PO_3H_2$; $C_2H_4OH$; $(C_2H_4)_2OH$; $C_2H_4(OH)_2$; $C_2H_4-NH-C_6H_5$; $C_2H_4-SO_2-NH_2$; $C_2H_4-SO_2-N-H-C_2H_4N(C_2H_5)_2$; $C_2H_4-SO_2-NH-(CH_2)_6OH$; $C_2H_4-SO_2-NH-(CH_2)_6-OH$; $C_2H_4-SO_2-N(CH_3)-C_2H_4OH$; $C_2H_4-SO_2-N(CH_3)-CH_2-COOH$; $C_2H_4-SO_2-N(CH_3)-CH_2-COOH$ and $C_2H_4SH$,

said coating forming a stable composition with the packing material substrate

5. Apparatus for breaking foams of surface active agents, fermentation or foams produced in the method of enrichment, fractionation and separation by foaming, which comprises

a. a packing material consisting essentially of glass, plastic or metal having a coating thereon of a compound of formula

$CF_3-(CF_2)_n-X$

wherein *n* is a whole number between 3 and 9 and X is selected from the group of $C_2H_4-SO_3-C_4H_9$; $C_2H_4-SO_3H$; $C_2H_4-SO_3H_2$, $(C_2H_5)_3N$; $C_2H_4-SO_2-NH_2$; $(C_2H_4)_2-COOH$; $(C_2H_4)_2-COOH$; $C_2H_3Cl-O-PO_3H_2$; $C_2H_3Cl-O-PO_3H_2$; $C_2H_4OH$; $(C_2H_4)_2-OH$; $C_2H_4(OH)_2$; $C_2H_4-NH-C_6H_5$; $C_2H_4-SO_2-NH_2$; $C_2H_4-SO_2-NH-C_2H_4N(C_2H_5)_2$; $C_2H_4-SO_2-NH-(CH_2)_6OH$; $C_2H_4-SO_2-NH-(CH_2)-6-OH$; $C_2H_4-SO_2-N(CH_3)-C_2H_4OH$; $C_2H_4-SO_2-N(CH_3)_2-C_2H_4OH$; $C_2H_4-SO_2-N-(CH_2)-CH_2-COOH$; $C_2H_4-SO_2-N(CH_3)-CH_2-COOH$ and $C_2H_4SH$,

said coating forming a stable composition with the packing material substrate, and

b. means for passing the foam to be broken through the packing.

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## 3,965,035
## ENZYME CARRIER REGENERATION

**Lorraine R. Bialousz, Elmira; Ethel R. Herritt; Donald J. Lartigue, both of Corning, and Wayne H. Pitcher, Jr., Painted Post, all of N.Y., assignors to Corning Glass Works, Corning, N.Y.**

**Filed Sept. 18, 1974, Ser. No. 507,199**

**Int. Cl.² B01J *21/20*; G11B *19/08*; G07F *11/00***

**U.S. Cl. 252—412** **9 Claims**

1. A method of regenerating a porous inorganic support material used for the adsorption of glucose isomerase and comprising porous particles of a $MgO-Al_2O_3$ composition wherein the amount of MgO is within the range of about 0.84 to 12.0% by weight, the particles have an average particle size within the range of about 4 to 200 mesh, U.S. Standard Sieve, and an average pore diameter within the range of about 100A to 1000A, the method comprising the steps of pyrolyzing the material at a temperature within the range of about 500°C. to 900°C. under conditions sufficient to remove essentially all carbonaceous matter and then reacting the material with an aqueous solution of citrate ions, the solution having a pH between about 6.0 and 10.0.

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## 3,965,036
## REGENERATION OF ACTIVATED CARBON WITH A SOLUTION OF SORBED SPECIES IN A SOLVENT

**Kenneth J. Himmelstein, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

**Continuation of Ser. No. 313,771, Dec. 11, 1972, abandoned. This application July 23, 1974, Ser. No. 491,017**

**Int. Cl.² B01D *15/06*; B01J *21/20***

**U.S. Cl. 252—414** **10 Claims**

1. In a method of recovering a sorbed organic compound from the group consisting of aliphatic acids, aromatic acids, alcohols and phenols from activated carbon by contacting said carbon with an organic solvent for said compound, the improvement which comprises:

employing as the solvent a solution containing a concentration of said compound in said solvent, said concentration being equal to the maximum concentration of said compound in said solvent which removes essentially as much of said compound per unit volume thereof as would a unit volume of pure solvent, wherein said concentration is calculated by the formula $X = a - b/c$, wherein $X$ = the concentration of the sorbed compound in the solvent, $a$ = the solubility of the sorbed compound in the solvent, $b$ = the amount of sorbed compound present in the activated carbon, and $c$ = the quantity of solvent to be contacted with the carbon bed.

10. A method of regenerating activated carbon containing a sorbed organic compound from the group consisting of

aliphatic acids, aromatic acids, alcohols and phenols by contacting said carbon with an organic solvent for said compound comprising:

a. contacting the activated carbon with a regenerant solution containing a concentration of said compound in said solvent, said concentration being equal to the maximum concentration of said compound in said solvent which removes essentially as much of said compound per unit volume as would a unit volume of pure solvent, wherein said concentration is calculated by the formula $X = a - b/c$, wherein $X$ = the concentration of the sorbed compound in the solvent, $a$ = the solubility of the sorbed compound in the solvent, $b$ = the amount of sorbed compound present in the activated carbon, and $c$ = the quantity of solvent to be contacted with the carbon bed,

b. removing the spent regenerant solution from the activated carbon,

c. separating the spent regenerant solution into at least two fractions consecutively with the spent regenerant flow,

d. treating the first fraction of the spent regenerant to separate the organic compounds from the solvent,

e. combining the remaining fraction of the spent regenerant with sufficient solvent to produce a fresh regenerant of said concentration, and

f. contacting the activated carbon with said fresh regenerant solution.

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3,965,037

## METHOD FOR REACTIVATING CARBON

**Sterling R. Kennedy, 3460 Hollenberg Drive, Bridgeton, Mo. 63044**

**Filed Sept. 25, 1974, Ser. No. 509,353**
**Int. Cl.² B01J *21/20*; B01D *15/06***
**U.S. Cl. 252—415** **10 Claims**

1. The method of reactivating in place carbon in a carbon bed which has been used in filtering water reclaimed from sewage and is contaminated with sewage components which consists in removing from the carbon excess water but discontinuing such removal before the water level reaches the level of the bed, adding hydrochloric acid to said carbon, mixing the water remaining with the hydrochloric acid by blowing pressurized air into said mixture to thoroughly mix the acid with the carbon and to minimize the formation of hydrogen sulfide, periodically repeating said mixing while retaining the mixture of acid and water with the carbon for sufficient time to reactivate the carbon, and then removing the acid and water from the carbon.

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3,965,038

## REGENERATION OF BISMUTH CONTAINING CATALYST USED IN THE HYDROFLUORINATION OF HALOGENATED HYDROCARBONS

**Neithart Schultz, Eichsel, uber Rheinfelden; Hans-Joachim Vahlensieck, Wehr, Baden, and Rudolf Gebele, Waldkraiburg, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany**

**Division of Ser. No. 344,673, March 26, 1973, Pat. No. 3,904,701, which is a continuation of Ser. No. 889,301, Dec. 30, 1969, abandoned. This application June 13, 1975, Ser. No. 586,839**
**Claims priority, application Germany, Jan. 3, 1969, 1900241**
**Int. Cl.² B01J *23/92, 37/14*; C07C *17/08***
**U.S. Cl. 252—416** **3 Claims**

1. A process for regenerating a catalyst composition consisting essentially of a $\gamma$ or $\eta$-aluminum oxide, 0.1 to 20 weight percent bismuth as a bismuth salt, said catalyst prepared by:

A. Heating $\gamma$ or $\eta$-alumina to about 50° to 120°C;

B. Impregnating said alumina with a substantially homogeneous solution of a water soluble bismuth salt;

C. Drying the so impregnated alumina;

D. Heating said dry impregnated alumina in the presence of hydrogen fluoride and air; and

E. Increasing the proportion of hydrogen fluoride in said air until cessation of the exothermic reaction which ensues whereby said catalyst contains 0.01 to 20 weight percent bismuth, 35 to 66 weight percent fluorine and 24 to 42 weight percent aluminum, and wherein said catalyst has become spent during a process of reacting a halogenated aliphatic or cycloaliphatic hydrocarbon having at least 2 carbon atoms with hydrogen fluoride to prepare the corresponding fluorinated hydrocarbon having more fluorine than the halogenated aliphatic or cycloaliphatic hydrocarbon reactant; which comprises heating said catalyst in air at a temperature of about 350° to 450°C.

2. A process according to claim 1 wherein said catalyst additionally contains 0.1 to 10 weight manganese and is regenerated by heating in air at about 250° to 350°C.

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3,965,039

## ION-EXCHANGE MOLDED CATALYST AND METHOD OF ITS PREPARATION

**Donat Nikolaevich Chaplits, ulitsa Pervomaiskaya, 9, kv. 36; Vladimir Pavlovich Kazakov, 1 Zhilaya ulitsa, 10, kv. 28; Emmanuil Gabrielovich Lazariants, ulitsa Pervomaiskaya, 9, kv. 2, all of Yaroslavl; Vladimir Filippovich Chebotaev, ulitsa Dnepropetrovskaya, 19, kv. 21, Moscow; Mikhail Ivanovich Balashov, Maly Kozikhinsky pereulok, 9, kv. 3, Moscow, and Leonid Antonovich Serafimov, ulitsa Dnepropetrovskaya, 29, kv. 170, Moscow, all of U.S.S.R.**

**Filed Nov. 19, 1974, Ser. No. 525,115**
**Int. Cl.² B01J *31/10***
**U.S. Cl. 252—426** **16 Claims**

1. An ion-exchange molded catalyst consisting of a sulfonated copolymer of styrene with a dialkenyl benzene selected from the group consisting of divinylbenzene and diisopropenyl benzene and of a sulfonated thermoplastic material selected from the group consisting of polyethylene, polypropylene and polyvinylchloride taken in a proportion of 1–4:1–2 by weight respectively, said catalyst having a compression strength from 98 to 200 kg/cm² and a static exchange capacity in terms of 0.1N NaOH of from 2.7 to 4.25 mg-equiv/g of catalyst.

2. A method of preparation of an ion-exchange molded catalyst consisting of a sulfonated copolymer of styrene with a dialkenyl benzene selected from the group consisting of divinylbenzene and diisopropenyl benzene, and a sulfonated thermoplastic material selected from the group consisting of polyethylene, polypropylene and polyvinylchloride taken in a proportion of 1–4:1–2 by weight respectively, said method consisting of mixing a copolymer of styrene with a dialkenyl benzene selected from the group consisting of divinylbenzene and diisopropenyl benzene, and a thermoplastic material in a proportion of 1–4:1–2 by weight respectively; molding the obtained mixture by extrusion with heating to the melting point of the thermoplastic material to produce molded elements; treating said molded elements first with a sulfonating agent at 20°–100°C and then with water.

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3,965,040

## PROCESS FOR PREPARING CATALYST

**Thaddeus P. Kobylinski; Brian W. Taylor, both of Gibsonia, and Roger F. Vogel, Butler, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.**

**Filed Sept. 25, 1974, Ser. No. 509,073**
**Int. Cl.² B01J *27/14, 29/12, 23/40***
**U.S. Cl. 252—435** **24 Claims**

1. A process for preparing a catalyst which comprises coating a support with a first solution containing a first metal salt selected from the group consisting of a salt of platinum and palladium, calcining, further coating the calcined base with a second solution containing a second metal salt selected from the group consisting of a salt of ruthenium and rhodium and a phosphorus compound selected from the group consisting of

a phosphorus oxide, a phosphorus salt and a phosphorus acid and then further calcining.

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## 3,965,041
## PROCESS FOR METAL SULFIDE CATALYST PREPARATION

**Jakob van Klinken, and Swan T. Sie, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.**

**Filed Sept. 27, 1974, Ser. No. 509,976**

**Claims priority, application Netherlands, Nov. 14, 1973, 7315573**

**Int. Cl.² B01J 27/14, 27/02**

**U.S. Cl. 252—437** **10 Claims**

1. A process for the preparation of catalysts comprising at least one sulfide of metals from the group consisting of nickel, cobalt, molybdenum and tungsten on a carrier, comprising

wetting with water a composition which contains one or more of the above-mentioned metals on a porous carrier and which has been calcined at a temperature between 175° and 700°C with decomposition of at least part of the metal salts used for applying the metals to the carrier;

treating the wetted composition with a hydrogen sulfide-containing gas at a temperature below 150°C, and

heating the product to a final temperature above 200°C, provided that the amount of water used for wetting the calcined composition corresponds to 20–120% of the amount of water the composition is capable of taking up within the pores of the carrier at 20°C after being wetted with water and dried in a dry gas at 110°C, provided that, if the calcined composition has a combined nickel and cobalt content of less than 4 parts by weight per 100 parts by weight of carrier, the calcination temperature does not exceed 600°C.

9. A process as in claim 1, wherein in the wetting step the calcined composition is wetted with an aqueous solution containing one or more compounds which promote the water-solubility of the metals present in the calcined composition which compounds are selected from the group consisting of phosphoric acid, phosphorous acid and hydrogen peroxide and the amount of said solution used for wetting the calcined composition corresponds to 20–120% of the amount of water said composition is capable of taking up within the pores of the carrier at 20°C after being wetted with water and dried in a gas at 110°C.

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## 3,965,042
## FORMATION OF ALUMINA-CONTAINING PARTICLES WITH ALUMINUM HYDROXIDE BINDER

**Raymond Douglas Feldwick, Cockeysville, and Darrell Edward Hildebrandt, Baltimore, both of Md., assignors to W. R. Grace & Co., New York, N.Y.**

**Filed Dec. 7, 1973, Ser. No. 422,721**

**Int. Cl.² B01J 29/06, 23/08**

**U.S. Cl. 252—455 R** **7 Claims**

1. A process for preparing nodules containing alumina, aluminosilicate, or alumina-aluminosilicate mixutres and characterized as having increased crush strength and greater attrition resistance which comprises:

a. preparing an aqueous solution of an acid salt of aluminum by dissolving salt salt in water,

b. preparing an aluminum hydroxide binder slurry having pH in the range from about 7.5 to about 9 and comprising from about 0.2 to about 5 percent by weight of $Al_2O_3$ in the hydroxide form by adding sufficient ammonia or aqueous solution of ammonium hydroxide with said aluminum salt solution, said slurry having a viscosity of from about 15 to about 60 centipoises prior to addition of an alumina-containing powder,

c. preparing a mixture by adding the slurry with a substantially dry powder of alumina, aluminosilicate, or a mixture of alumina with aluminosilicate, said powder being added in an amount of from about 92.5 to about 99.8 parts by weight per one part by weight of the aluminum salt, calculated as $Al_2O_3$, in the slurry,

d. forming nodules of a desired shape from the mixture,

e. drying the nodules,

f. calcining the dried nodules, and

g. recovering nodules of treated powder bonded with from about 0.05 to about 1.5 parts by weight of alumina ($Al_2O_3$) per 100 parts by weight of the nodules.

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## 3,965,043
## CATALYST FOR ALKYLATING AROMATIC HYDROCARBONS THEREFOR

**George E. Stridde, Houston, Tex., assignor to NL Industries, Inc., New York, N.Y.**

**Filed Sept. 6, 1974, Ser. No. 503,985**

**Int. Cl.² B01J 29/06, 29/00**

**U.S. Cl. 252—455 R** **6 Claims**

1. A catalyst for the alkylation of aromatic hydrocarbons with an olefin-acting compound selected from the group consisting of ono-olefins, alkyl bromides, alkyl chlorides, and mixtures thereof, which comprises a trioctahedral 2:1 layer-lattice hectorite-type mineral containing a metallic cation having a Pauling electronegativity greater than 1.0 in cation exchange positions on the surface of said mineral, said hectorite-type mineral having the following structural formula:

$$\left[(Mg_{6-x}{}^{2+}\ Li_x{}^{+})^{y/}\ Si_8\ O_{20}\ (OH)_{4-y}\ F_y\right]\ \frac{x}{z}\ M^z$$

where 0.33 $x$ 1, 0 $y$ 4, and wherein M is at least one of said metallic cations selected from the group consisting of $Al^{3+}$, $Cr^{3+}$, $Ga^{3+,\ /x3+}$, $Co^{3+}$, $Co^{2+}$, $Ni^{2+}$, $Be^{2+}$, $Mg^{2+}$, $La^{3+}$, $Ce^{3+}$, $Pd^{2+}$, and mixtures thereof.

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## 3,965,044
## METHOD OF METAL CHROMITE PREPARATION

**Harold E. Manning, and Michael C. Ellis, both of Houston, Tex., assignors to Petro-Tex Chemical Corporation, Houston, Tex.**

**Filed Aug. 1, 1974, Ser. No. 493,500**

**Int. Cl.² B01J 21/04, 23/16, 23/84**

**U.S. Cl. 252—465** **14 Claims**

1. A method for preparing metal chromites comprising preparing an aqueous solution of a chromium (VI) oxygen containing compound and a soluble compound of a divalent metal selected from the group consisting of Mg, Sr, Ba, Fe, Mn, Co, Ni, Cu, Zn, Cd and mixtures thereof, admixing a soluble organic reducing agent with said aqueous solution, heating the solution to a temperature of about 75° to 100°C., precipitating a substantially water insoluble divalent metal chromite compound of chromium (III) and said divalent metal, recovering said precipitate, and calcining said precipitate to produce an activated dehydrogenation catalyst.

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## 3,965,045
## IRON CATALYST

**Bruce E. Leach, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.**

**Filed Feb. 20, 1975, Ser. No. 551,573**

**Int. Cl.² B01J 21/04, 21/74**

**U.S. Cl. 252—466 J** **16 Claims**

1. A catalyst prepared by a process comprising forming a mixture of magnetite and alumina derived from the water hydrolysis of aluminum alkoxides, said alumina being in the alpha monohydrate or gamma forms and being present in an amount in the range of about 0.01 to 5 weight percent based on the magnetite; calcining the mixture at temperatures in the range of about 650°C to a temperature below that at which the gamma form of alumina is significantly converted to the delta form; and reducing the calcined mixture with a reducing gas

at a temperature of about 400° to 475°C until 75 – 80. weight percent of the magnetite is reduced.

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3,965,046

## PROCESS OF MAKING METAL POWDERS AND PRODUCTS PRODUCED THEREBY

Robert J. Deffeyes, Arlington, Tex., assignor to Graham Magnetics Incorporated, Graham, Tex.

Filed Sept. 26, 1974, Ser. No. 509,468
Int. Cl.² B01J 23/74; C22B 23/04
U.S. Cl. 252—472 30 Claims

1. In a process for making metal-bearing powders comprising the formation of an organometallic salt and the subsequent decomposition of said salt to a said metal-bearing powder, the improvement comprising the steps of

1. reacting a carboxylic acid with a first metal reactant to form an organometallic salt seed,
2. reacting a carboxylic acid with a second metal reactant, in a liquid medium with said first carboxylic salt, and growing a second organometallic salt material on said seed, said seed causing a modification in the normal growth pattern of said second salt,
3. recovering a solid organometallic salt product comprising both said seed and said second organometallic salt, and
4. decomposing said salt product to a metal-bearing powder.

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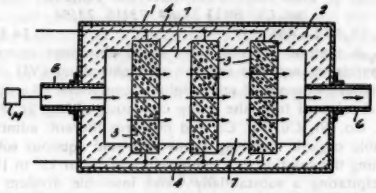
3,965,047

## ELECTRICAL RESISTANT FLUID-PERMEABLE HEAT GENERATING MEMBER AND METHOD OF PRODUCING THE SAME

Takeshi Yamaguchi, Tokyo, Japan, assignor to Ernest K. Cleland, Milwaukee, Wis.

Continuation-in-part of Ser. No. 260,133, June 6, 1972, Pat. No. 3,828,161. This application Aug. 15, 1974, Ser. No. 497,821
Claims priority, application Japan, July 20, 1971, 46-54014
Int. Cl.² H01B 1/04
U.S. Cl. 252—503 6 Claims



1. A sintered electrically resistive fluid-permeable heat generating member composed of a mixture of materials based on a starting mixture comprised of:

about 87 to 94 percent by weight of electrically conductive particles;
about 0.2 to 3 percent by weight of a thermally decomposable porosity control material;
about 3 to 9.5 percent by weight of an organic binding material; and
about 0.2 to 3 percent by weight of a foaming agent.

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3,965,048

## SOAP CURD DISSOLVING DRAIN CLEANER

Justin J. Murtaugh, Guilford, Ind., assignor to The Drackett Company, Cincinnati, Ohio

Filed Mar. 29, 1974, Ser. No. 456,429
Int. Cl.² B08B 9/06; C11D 7/06, 7/32; C23G 5/00
U.S. Cl. 252—527 10 Claims

1. A drain cleaning composition consisting essentially of:

from about 0.25% to 10%, by weight, of a potassium salt of a member selected from the group consisting of nitrilotriacetic acid, N-2-hydroxyethylimino diacetic acid, an alkylene polyamine polycarboxylic acid, and mixtures thereof;
from about 0.50% to 10%, by weight, of potassium hydroxide; and
up to about 99%, by weight, of water, wherein said composition is substantially free of other alkali metal ions.

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3,965,049

## ONE-STEP SYNTHESIS OF AROMATIC ORGANIC DISELENIDES

Bernard Grushkin, Pittsford, N.Y., and Michael N. Salzman, Winnetka, Calif., assignors to Xerox Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 299,980, Oct. 24, 1972, abandoned. This application May 20, 1974, Ser. No. 471,376
Int. Cl.² C08G 79/00; C07D 345/00, 293/00
U.S. Cl. 260—2 M 5 Claims

1. A method for the formation of aromatic diselenide compounds which comprises reacting in dimethylformamide an alkali metal diselenide and halogen substituted aromatic compound containing two replaceable halogen atoms and having no strong electron withdrawing groups other than halogen on the halogen bearing ring or on a ring adjacent to the halogen bearing ring, to thereby form an aromatic diselenide compound, the organic portion of which corresponds to the non-halogen portions of the halogen substituted aromatic compound.

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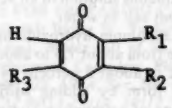
3,965,050

## PROCESS FOR PREPARING CROSS-LINKED ELASTOMER COMPOSITIONS AND COMPOSITIONS CURABLE WITH CROSS-LINKING AGENTS USED THEREFOR

Sachio Shimogawa; Takashi Fujio, both of Amagasaki; Mikio Arika, Nishinomiya; Nobuo Yamada, Amagasaki; Takashi Kodama, Itami, and Tetsuya Nakata, Ibaragi, all of Japan, assignors to Osaka Soda Co., Ltd., Osaka, Japan

Filed June 3, 1974, Ser. No. 475,771
Int. Cl.² C08G 65/32; C08L 19/00; C08J 3/24
U.S. Cl. 260—2 A 7 Claims

1. In the process for preparing a cross-linked elastomer composition by heating a mixture of a homopolymer of epichlorohydrin or a copolymer of epichlorohydrin and an olefin oxide with a cross-linking agent, the improvement which comprises adding to the mixture a compound selected from the group consisting of quinones and their derivatives of the following formula (1)



(1)

wherein $R_1$, $R_2$ and $R_3$, which may be the same or different, are each a member selected from the group consisting of hydrogen and hydrocarbon moieties, and $R_1$ and $R_2$ may together form a benzene ring.

3,965,051

## COMPOSITE MATERIALS

Peter Markusch, Cologne, and Dieter Dieterich, Leverkusen, both of Germany, assignors to Bayer Aktiengeselischaft, Leverkusen, Germany

Filed Nov. 26, 1974, Ser. No. 527,388

Claims priority, application Germany, Nov. 30, 1973, 2359611

Int. Cl.² C08J 9/00

U.S. Cl. 260—2.5 AK 15 Claims

1. A process for the production of a composite material which comprises:

A. mixing

i. from 1–90 percent by weight of an organic polyisocyanate which contains 2–200 milliequivalents of ionic groups or groups which are capable of forming ionic groups in the presence of alkaline or organic basic compounds, per 100 grams of polyisocyanate,

ii. from 10–99 percent by weight of an organic or inorganic particulate or fibrous material, and

B. allowing the resultant mixture to react.

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3,965,052

## PROCESS FOR PREPARING LOW SMOKE-GENERATING RIGID FOAMS

Kazuo Iwasaki, Ohta, Japan, assignor to Kohkoku Chemical Industry Co., Ltd., Tokyo, Japan

Filed Apr. 24, 1974, Ser. No. 463,688

Claims priority, application Japan, Nov. 18, 1973, 48-133819

Int. Cl.² C08G 18/48

U.S. Cl. 260—2.5 AW 7 Claims

1. In a process for preparing low smoke-generating rigid foams from a mixture of a polyisocyanate, a polyol, a blowing agent, a catalyst and a surfactant, the improvement which comprises using an aromatic polyisocyanate as the polyisocyanate in an amount from 3 to 5 times on the bases of chemical equivalent of the total amount of compounds having active hydrogen, and using a polyether polyol having an hydroxyl value of 69 to 200 and containing from 10 to 60 mole% of primary hydroxyl groups and using water as the blowing agent in an amount from 2 to 6 parts by weight per 100 parts of the polyol, together with an isocyanate trimerization catalyst.

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3,965,053

## FOAMED POLYOLEFIN FOILS

Frank Kleiner, Cologne; Wolfgang Becker, Hilden, and Karl Heinz Muller, Quadrath-Ischendorf, all of Germany, assignors to Bayer Aktiengeselischaft, Germany

Filed Jan. 9, 1975, Ser. No. 539,800

Claims priority, application Germany, Jan. 10, 1974, 2401004

Int. Cl.² C08F 10/02

U.S. Cl. 260—2.5 HA 9 Claims

1. A process for the continuous production of a foamed foil from a polymer based on an $\alpha,\beta$-monoolefinically unsaturated monomer, said process comprising adding 0.05–0.2% by weight, based on the polymer, of a diamide of the formula

$$R^1—CO—NH—(CH_2)_n—NH—CO—R^1$$

to said polymer in the solid or molten state either before or during foamed foil production by a chemical blowing agent, said $R^1$ and $R^1$, which may be the same or different, being alkyl or alkenyl having 4 to 20 carbon atoms and $n$ being an integer of from 2 to 6.

3,965,054

## FOAMABLE POLYOLEFIN COMPOSITION AND METHOD FOR MANUFACTURING FOAMED POLYOLEFIN

Akio Nojiri, Yokohama; Naonori Shiina, Tokyo; Hiroyuki Nakae, Yokohama; Hideyo Ueno, Hiratsuka, and Isamu Namiki, Yokohama, all of Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 457,392, April 2, 1974, abandoned. This application Oct. 14, 1975, Ser. No. 622,375

Claims priority, application Japan, Apr. 10, 1973, 48-40600; May 29, 1973, 48-59966; June 4, 1973, 48-62759; Oct. 30, 1973, 48-121902

Int. Cl.² C08J 9/06, 9/08, 9/10

U.S. Cl. 260—2.5 HA 17 Claims

1. A method for manufacturing foamed polyolefin comprising:

a. mixing 100 parts polyolefin selected from the group consisting of ethylene homopolymer, ethylene copolymer, propylene homopolymer and propylene copolymer with 0.01 to 3 parts of cross-linking agent selected from the group consisting of organic peroxides, azide compounds and silicon-containing peroxides, 0.01 to 30 parts of blowing agent which decomposes at a temperature higher than the decomposition temperature of said cross-linking agent to evolve gas in a volume of not more than 2cc per gram of blowing agent in 2 minutes after heating to 180°C begins in the thermal decomposition test, and 0.01 to 2 parts of gas trapping agent selected from the group consisting of a diallyl cyanurate, diallyl isocyanurate, triallyl cyanurate, and triallyl isocyanurate,

b. shaping the mixture into a desired form and then

c. heating the shaped mixture above the decomposition temperature of said blowing agent.

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3,965,055

## FREE CURING RUBBER COMPOSITION

Daniel Shichman, Trumbull, and Sung Whee Hong, Cheshire, both of Conn., assignors to Uniroyal Inc., New York, N.Y.

Continuation-in-part of Ser. No. 290,909, Sept. 21, 1972, abandoned, which is a division of Ser. No. 66,753, Aug. 25, 1970, Pat. No. 3,701,702. This application Feb. 14, 1974, Ser. No. 442,519

Int. Cl.² B29C 25/00; C08L 7/00

U.S. Cl. 260—3 5 Claims

1. A composition of matter comprising a blend of vulcanizable material in admixture with between about 2–10% by weight of a fiber forming, semi-crystalline, thermoplastic resin which possesses a melting point of 250°F. or greater, said resin being dispersed in said vulcanizable material in the form of particles having a cross sectional dimension (D) not greater than one-half micron and a length (L) to (D) ratio of 2 or greater.

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3,965,056

## ADHESIVE EXTENDED COMPOSITION

Ronald M. T. Stout, Surrey, and Douglas E. Rogerson, Richmond, both of Canada, assignors to MacMillan Bloedel Limited, Vancouver, Canada

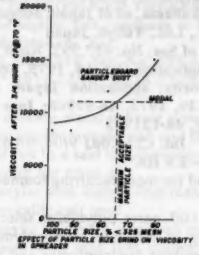
Continuation of Ser. No. 400,391, Sept. 24, 1973, abandoned. This application Aug. 25, 1975, Ser. No. 607,593

Int. Cl.² C08L 1/02

U.S. Cl. 260—17.2 2 Claims

1. An adhesive composition comprising strongly adhesive aqueous alkaline phenol/formaldehyde resin and as an extender wood particles modified with about 6 to 18% by weight of the particles of cured urea/formaldehyde thermosetting resin,

said modified wood particles being ground to where 75% or more of the modified wood particles are small enough to pass



EFFECT OF PARTICLE SIZE GRIND ON VISCOSITY IN SPREADER

through a 325 mesh screen and with substantially no particles larger than about 150 microns.

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3,965,057

## ADHESION CONTROL FOR SAFETY GLASS LAMINATES VIA POLYURETHANE COMPOSITION

Vernon G. Ammons, Glenshaw, and James C. Vanek, New Kensington, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 403,138, Oct. 3, 1973, Pat. No. 3,900,686. This application Feb. 19, 1975, Ser. No. 551,188

Int. Cl.² C08G 18/30; B32B 27/18, 27/40

U.S. Cl. 260—18 TN 19 Claims

1. A polyurethane composition comprising the reaction product of a polyisocyanate or a polythioisocyanate and a compound containing at least two groups which are reactive with the isocyanate or thioisocyanate groups; said polyurethane composition containing from about 0.01 to 0.30 percent by weight based on the weight of the polyurethane composition of an organic phosphorus acid selected from the class consisting of:

$$R_m—\overset{\overset{O}{\|}}{P}—(OH)_p \quad \text{and} \quad R_m—P—(OH)_p$$

where R is an alkyl containing from 1 to 18 carbon atoms, alkyl, alkaryl, alkoxy, aryloxy or an alkaryloxy group and may be linked directly to the phosphorus atom or linked by means of an oxygen atom, $m$ and $p$ are integers of from 1 to 2 and $m + p$ must equal 3, and from 0.05 to 0.5 percent by weight of an organo-functional silane having the structural formula:

$$(R)_n - Si - (X)_n$$

wherein $m$ and $n$ are whole integers of from 1 to 3 and $m + n$ is equal to 4, wherein X is a group which can hydrolyze to yield a hydroxyl group and R is an organic moiety selected from the class consisting of alkyl groups containing from 1 to 5 carbon atoms, aryl, vinyl and epoxy-containing organic moieties present in amounts sufficient so as to control the degree of adhesion of the polyurethane composition, when in sheet form, to glass; the weight ratio of organic phosphorus acid to organo-functional silane being from about 0.05 to 0.80:1 inclusive; said polyurethane being characterized as having a degree of adhesion to glass of about 1 to 10 pounds per lineal inch when a sheet of said polyurethane is laminated to a sheet of glass, said degree of adhesion being maintained when the laminate is subjected to 100 percent humidity, and 120°F., for at least 5 days.

3,965,058

## COREACTION PRODUCTS

Michael Yurcheshen, Parma Heights; Morris Levine, Cleveland Heights, and Ralph M. Brane, Bay Village, all of Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 444,793, April 1, 1965, Pat. No. 3,502,557. This application Aug. 29, 1969, Ser. No. 854,262

Int. Cl.² C09D 3/50, 3/52, 5/40

U.S. Cl. 260—21 44 Claims

1. An ungelled thermosetting reaction product of an amine-aldehyde condensation product selected from the group consisting of a melamine-aldehyde condensation product, a formoguanamine-aldehyde condensation product, an acetoguanamine-aldehyde condensation product and a benzoguanamine-aldehyde condensation product and a polyfunctional hydroxylcontaining carboxylic acid.

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3,965,059

## ALKYD RESIN

John Charles Kerridge, and John William Syson, both of Billingham, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Nov. 29, 1974, Ser. No. 528,545

Claims priority, application United Kingdom, Dec. 10, 1973, 57124/73

Int. Cl.² C08G 63/02; C08L 67/06; C09D 3/66

U.S. Cl. 260—22 CB 9 Claims

1. In an alkyd resin which comprises the condensation product of a polybasic acid and a polyhydric alcohol, the improvement whereby part at least of the polybasic acid is the reaction product of an olefinically unsaturated hydrocarbon resin with an alpha, beta-olefinically unsaturated monobasic acid, dibasic acid, or derivative thereof selected from the group consisting of acrylic acid, methacrylic acid, maleic acid, maleic anhydride, fumaric acid, itaconic acid, citraconic acid, itaconic acid anhydride, citraconic acid anhydride, mesaconic acid and the lower alkyl esters of these acids.

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3,965,060

## ADHESIVE COMPOSITION (CASE A)

Pallavoor R. Lakshmanan, Allison Park, Pa., assignor to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Dec. 26, 1974, Ser. No. 536,318

Int. Cl.² C08L 93/00

U.S. Cl. 260—27 BB 6 Claims

1. An adhesive composition consisting essentially of a styrene-butadiene block copolymer, a coumarone-indene tackifier, a solvent selected from the group consisting of aromatic hydrocarbons having from six to eight carbon atoms, aliphatic hydrocarbons having from six to eight carbon atoms, ketones having from two to four carbon atoms and esters having from two to four carbon atoms, said solvents having a boiling point between about 50° and 145° C., a zinc salt of rosin and, optionally, water wherein the components thereof are present in the following ranges:

| Component | Weight Percent |
|---|---|
| Styrene-Butadiene Block Copolymer | 100 |
| Tackifier | 10–400 |
| Solvent | 100–5,000 |
| Zinc Salt of Rosin | 0.1–40 |
| Water | 0–10. |

3,965,061

## ADHESIVE COMPOSITION

David L. Bash, Verona, and Pallavoor R. Lakshmanan, Allison Park, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed May 6, 1975, Ser. No. 574,897
Int. Cl.² C08L *93/00*
U.S. Cl. 260—25 5 Claims

1. An adhesive compositions consisting essentially of about 20 to about 80 parts by weight of a low softening, high crystallizing chloroprene polymer, about 80 to about 20 parts by weight of a low softening, medium crystallizing chloroprene polymer, about 30 to about 55 parts by weight of an oil-soluble, heat-hardenable phenol aldehyde resin, about five to about 20 parts by weight of a zinc salt of rosin and about five to about 15 parts by weight of an alkali metal or alkaline earth metal oxide or hydroxide.

3,965,062

## ETHYLENE/VINYL ACETATE/ISOBUTYLENE TERPOLYMER COATING COMPOSITION

Claude J. Stiles, Tuscola, Ill., assignor to National Distillers and Chemical Corporation, New York, N.Y.

Continuation of Ser. No. 288,211, Sept. 11, 1972, abandoned. This application Nov. 15, 1974, Ser. No. 524,177
Int. Cl.² C08J *3/20*
U.S. Cl. 260—28.5 AV 8 Claims

1. In a hot melt coating process, the improvement which comprises using a coating containing a terpolymer of ethylene, about 18–28 weight percent vinyl acetate and about 0.5–3 weight percent isobutylene, said terpolymer having a melt index of at least about 150.

5. In a hot melt coating composition comprising wax and an additive, the improvement which comprises employing a terpolymer of ethylene, about 18–28 weight percent vinyl acetate, and about 0.5–3 weight percent isobutylene having a melt index of at least about 150 as said additive.

3,965,063

## HYDROPHILIC CONTACT LENSES AND LENS POLYMER

Frank O. Holcombe, Jr., Beltsville, Md., assignor to Burton, Parsons and Company, Inc., Washington, D.C.

Continuation-in-part of Ser. No. 476,896, June 6, 1974, Pat. No. 3,926,892. This application June 30, 1975, Ser. No. 591,859
Int. Cl.² C08F *216/04*; C08L *33/14*
U.S. Cl. 260—29.6 TA 7 Claims

1. A hydrophilic gel polymer consisting essentially of the addition copolymer of hydroxyethyl methacrylate, about 1 to 20 weight percent N(1,1-dimethyl-3-oxobutyl) acrylamide, up to about 10% iso-butyl methacrylate, up to about 5 weight percent cyclohexyl methacrylate and about 0.01 to 0.50 weight percent trimethylolpropane trimethacrylate.

6. A hydrophilic gel polymer contact lens comprising a hydrated gel of the polymer of claim 1 containing about 25 to 50 weight percent weight.

3,965,064

## PROCESS FOR THE CRYSTALLIZATION OF POLYCARBONATES AND PRODUCTS OBTAINED

Jean Mercier, Kessel-Lo; Francis Galiez, Salve, and Roger Legras, Seloignes, all of Belgium, assignors to Unibra S.A., Brussels, Belgium

Continuation of Ser. No. 380,218, July, 1973, abandoned. This application Oct. 29, 1974, Ser. No. 519,041
Int. Cl.² C08K *5/09*, *5/50*
U.S. Cl. 260—30.6 R 24 Claims

1. A process for crystallizing a bisphenol polycarbonate polymer wherein a nucleating agent in finely divided form, having a melting point above 180°C and selected from the group consisting of metal salts of carbonic acid, metal salts of organic acids and mixtures thereof and a plasticizer are incorporated into said polycarbonate polymer and the mixture thus obtained is crystallized at a temperature higher than its glass transition temperature.

3,965,065

## METHOD OF IMPROVING THE ELECTRICAL PROPERTIES OF ORGANOPOLYSILOXANE ELASTOMERS AND COMPOSITIONS THEREFOR

Edward C. Elliott, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Sept. 8, 1975, Ser. No. 611,278
Int. Cl.² C08L *83/04*
U.S. Cl. 260—37 SB 7 Claims

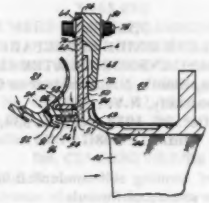
1. A method for preparing an improved elastomer-forming composition which comprises forming a mixture comprising (A) an organopolysiloxane which is convertible to the solid elastic state and (B) aluminum hydrate, and heating said mixture at a temperature of at least 100°C. for a time of at least 30 minutes.

3,965,066

## COMBUSTOR-TURBINE NOZZLE INTERCONNECTION

Albert P. Sterman; Henry J. Brands, and Frederick W. Weissborn, Jr., all of Cincinnati, Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Mar. 15, 1974, Ser. No. 451,512
Int. Cl.² F02C *7/20*, *7/12*, *7/18*
U.S. Cl. 60—39.32 17 Claims



1. A seal for use between an annular combustor and a turbine nozzle disposed downstream of the combustor, the nozzle including a circumscribing sidewall, wherein the seal comprises:

an upstream-extending first flange associated with the nozzle;

a downstream-extending second flange associated with the combustor;

clamping means for frictionally clamping and engaging said first flange, said clamping means including first and second spaced and opposed walls, each of said walls abutting and frictionally engaging said first flange, and further including tensioning means for applying a clamping load between said first and second walls said clamping load effective to hold each of said first and second walls in said abutting and frictional engagement with said first flange;

and said clamping means having a portion projecting from one of said walls for frictionally retaining and engaging said second flange.

3,965,067

## METHOD FOR PLASTICIZING SULFUR

Jung Il Jin, Irvington, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Aug. 14, 1974, Ser. No. 497,357
Int. Cl.² C08K *5/00*
U.S. Cl. 260—45.8 A 8 Claims

1. A process for plasticizing sulfur which comprises intimately intermixing a stabilized polysulfide composition having

a sulfur rank of from about 3.5 to 5 with sulfur in a ratio by weight of stabilized polysulfide to sulfur of from about 3:97 to about 6:4.

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**3,965,068**

## SMOKE RETARDANT VINYL CHLORIDE AND VINYLIDENE CHLORIDE POLYMER COMPOSITIONS

**Elmer D. Dickens, Jr., Richfield, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio**

**Filed Feb. 10, 1975, Ser. No. 548,569**
**Int. Cl.² C08J 3/20**
**U.S. Cl. 260—45.75 N** **32 Claims**

1. A smoke retardant composition comprising a vinyl chloride or vinylidene chloride polymer together with (A) at least one nickel compound selected from the group consisting of $NiCO_3$, $NiCl_2$, NiO, NiS and nickel acetylacetonate and (B) at least one zinc compound selected from the group consisting of $ZnCO_3$, $ZnCrO_4$, $ZnMoO_4$, $Zn_3(PO_4)_2$, $Zn_2SiO_4$, $Zn_2SO_4$, $ZnTiO_3$, $Zn_2ZrO_4$, zinc ammonium sulfate, zinc borate zinc acetylacetonate, zinc formate, zinc oxalate, and $M_{2-xz}Zn_{3+x}[Fe(CN)_6]_2 \cdot yH_2O$, wherein M is an alkali metal, $x$ is from 0 to 1, and $y$ is from 0 to 4, said compounds (A) and (B) being present in a total amount from about 0.25 to about 20 weight parts per 100 weight parts of polymer.

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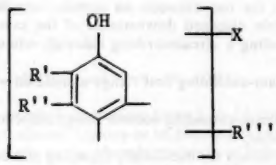
**3,965,069**

## POLYPHENYLENE OXIDE IS PREPARED USING A MIXTURE OF MANGANESE CHELATES AS A CATALYST

**Walter K. Olander, Elnora, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Dec. 20, 1974, Ser. No. 534,903**
**Int. Cl.² C08G 61/10**
**U.S. Cl. 260—47 ET** **20 Claims**

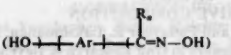
1. A process of forming self-condensation products of a phenol having the structural formula:



where X is a substituent selected from the group consisting of hydrogen, chlorine, bromine, and iodine; R′ is a monovalent constituent selected from the group consisting of hydrogen, hydrocarbon radicals, halohydrocarbon radicals having at least two carbon atoms between the halogen atoms and phenol nucleus, hydrocarbonoxy radicals, and halohydrocarbonoxy radicals having at least two carbon atoms between the halogen atoms and phenol nucleus, R″ and R‴ being the same as R′ and, in addition, halogen under reaction conditions which comprise contacting said phenol with oxygen in the presence of a basic reaction medium and a mixture of Type (A) and Type (B) manganese chelate complexes selected from Type (A) complexes of the formulas:

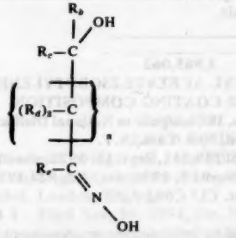
Type (A): $(L^1)_xMn$,

where $L^1$ is a ligand derived from an ortho-hydroxyareneoxime of the general formula



wherein $R_a$ is independently selected from the group consisting of hydrogen and lower alkyl radicals having from 1–5 carbon atoms, Ar is at least a divalent arene radical having at least one -OH radical and at least one

4 N-OH radical attached directly to ortho-positioned arene ring carbon atoms, and an ω-hydroxyoxime of the formula



wherein each $R_b$, $R_c$, $R_d$ and $R_e$ is independently selected from the group consisting of hydrogen, acyclic and cyclic organic radicals, and $n$ is a positive integer equal to 0 or 1, Mn is the transition metal manganese(II), and $x$ is a positive number at least equal to about 0.5, and selected from Type (B) complexes of the formula:

Type (B): $(L^2)_xMn$,

wherein $L^2$ is a ligand other than an $L^1$ ligand, Mn is the transition metal manganese, and $x$ is a positive number at least equal to about 0.5.

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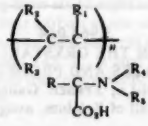
**3,965,070**

## CROSSLINKED VINYLCARBONYL RESINS HAVING α-AMINO ACID FUNCTIONALITY

**Richard B. Wuchter, Rydal, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.**

**Filed Oct. 7, 1974, Ser. No. 512,813**
**Int. Cl.² C08G 10/04**
**U.S. Cl. 260—73 R** **12 Claims**

1. A resin having α amino acid functionality and which is derived from a crosslinked vinylcarbonyl copolymeric backbone, said resin having the followng general formula:



wherein R is H or $C_1$ – $C_4$ alkyl; $R_1$ is H or $C_1$ – $C_{10}$ alkyl; $R_2$ and $R_3$ are independently selected from H,$C_1$–$C_{18}$ alkyl, aryl, alkylaryl, and cycloalkyl; and $R_4$ and $R_5$ are independently selected from H, $C_1$ – $C_{18}$ alkyl, and arylalkyl or taken together are linked to form a cyclic ring, said resin being crosslinked with about 2 to 30% by weight of at least one crosslinking monomer selected from polyvinyl aromatic hydrocarbons and polyvinyl ethers and esters of polyhydric alcohols.

3,965,071

## POLYESTER CATALYSTS

Euan McClelland, Harrogate, England, assignor to Imperial Chemical Industries Limited, London, England

Filed July 1, 1974, Ser. No. 484,937

Claims priority, application United Kingdom, July 16, 1973, 33716/73

Int. Cl.² C08G *63/14*

U.S. Cl. 260—75 R 21 Claims

1. A process for preparing a fiber-forming polymeric polyester or copolyester which comprises first forming an ester by esterification reaction between an aromatic dicarboxylic acid and a diol in the presence of a titanium compound as esterification catalyst, deactivating the catalytic titanium compound after the esterification is substantially complete by reacting said compound with phosphoric acid or a phosphate ester and thereafter polycondensing said ester in the presence of a polycondensation catalyst which is a compound selected from the group consisting of antimony and germanium compounds which are soluble in the reaction mixture to form said polyester or copolyester, the diol being a diol of the formula $HO(CH_2)_nOH$ wherein *n* is not less than 2 and not greater than 10 and the titanium compound being a tetraalkyl titanate wherein alkyl is of 1 to 4 carbon atoms, a titanate of ethylene glycol, hexylene glycol or octylene glycol, or isopropyl triethanolamine titanate, sodium or lithium titanate or a titanosiloxane.

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3,965,072

## POLYUREA-URETHANE POLYMERS FROM UREA, DIAMINES AND AMINOALCOHOLS

Kenneth H. Markiewitz, Wilmington, Del., assignor to ICI United States Inc., Wilmington, Del.

Division of Ser. No. 880,892, Nov. 28, 1969. This application June 21, 1973, Ser. No. 372,445

Int. Cl.² C08G *71/02*; D06M *15/52*

U.S. Cl. 260—77.5 C 4 Claims

1. A polyureaurethane polymer prepared by reacting urea with an equal molar amount of a mixture of an amino alcohol and a diamine at a temperature from 150°C to 220°C, wherein the mixture contains from 10 to 90% by weight of a diamine and from 90 to 10% by weight of amino alcohol, wherein the amino alcohol has the formula $H_2N(RO)_m(CHR''O)_nH$ wherein m is 0 or 1, n an integer from 2 to 14, R is an alkylene group having from 3 to 5 carbon atoms, and each R is independently hydrogen or methyl, and wherein the diamine has the formula

$$H_2H\text{-}(RO)_m\text{-}(CH_2CHR''O)_q\text{-}CH_2CHR''\text{-}NH_2$$

wherein *m* is 0 or 1, *q* is an integer from 2 to 13, R is an alkylene radical having from 3 to 5 carbon atoms and each R'' is independently hydrogen or methyl.

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3,965,073

## PREPARATION OF RAPID SETTING NON-ELASTOMERIC POLYURETHANE COMPOSITIONS IN THE PRESENCE OF ESTER-MODIFIED POLYOXYALKYLENE COMPOUNDS

Franciszek Olstowski, Freeport, and Donald B. Parrish, Lake Jackson, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 366,835, June 4, 1973, Pat. No. 3,878,157, which is a continuation-in-part of Ser. No. 179,149, Sept. 9, 1971, abandoned. This application Dec. 17, 1973, Ser. No. 425,467

Int. Cl.² C08G *18/00*

U.S. Cl. 260—77.5 AN 21 Claims

1. A non-elastomeric, non-cellular dense, solid polymer having a density of at least about 1 gram/cc resulting from admixture of the components of a composition comprising:

A. a polyether polyol having from 3 to about 8 hydroxyl groups and a hydroxyl equivalent weight between about 75 and about 230,

B. an organic polyisocyanate,

C. a liquid modifier compound having a boiling point above about 150°C selected from the group consisting of ester-modified hydroxyl-containing polyoxyalkylene compounds having an average hydroxyl equivalent weight above about 700 when such compounds contain 1 or 2 hydroxyl groups and above about 500 when the compound contains 3 or more hydroxyl groups and mixtures thereof, and

d. a non-amine-containing catalyst for urethane formation, which is an organo-metal compound; component

wherein components (A) and (B) are present in amounts so as to provide an NCO:OH ratio of from about 0.8:1 to about 2:1; component (C) is present in quantities of from about 20 to about 50 percent with the proviso that when component (B) is a prepolymer containing less than about 40% NCO groups by weight, then component (C) is present in quantities of from about 10% to about 50% by weight of the sum of components (A), (B) and (C); and component (D) is present in quantities of from about 0.2 to about 10 percent by weight of the sum of the weights of component (A), (B) and (C); and wherein said polymer can be demolded within less than about 5 minutes, without the application of an external source of heat, after admixture of said composition.

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3,965,074

## HOMOPOLYMERS OF POLYFLUORINATED VINYL ISOCYANATES

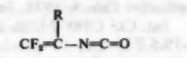
William J. Middleton, Chadds Ford, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 435,494, Jan. 22, 1974, which is a division of Ser. No. 176,709, Aug. 31, 1971, Pat. No. 3,816,495. This application Oct. 22, 1975, Ser. No. 624,975

Int. Cl.² C08G *18/81*

U.S. Cl. 260—77.5 R 3 Claims

1. A homopolymer of a vinyl isocyanate of the formula



wherein:

R is fluorine, lower perfluoroalkyl, lower ω-chloroperfluoroalkyl or lower ω-hydroperfluoroalkyl.

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3,965,075

## CATALYZED PROCESS FOR IMIDE-ALCOHOL CONDENSATION

James W. Edwards, St. Louis, Mo., assignor to Monsanto Company

Filed July 22, 1974, Ser. No. 490,438

Int. Cl.² C08G *69/20*, *69/44*

U.S. Cl. 260—78 L 10 Claims

1. A catalyzed imide-alcohol condensation process for the preparation of polymeric compounds of polyester-polyamides comprising: contacting alcohols having one or more hydroxyl groups attached to an aliphatic carbon and acyl lactams, said contacting being in amounts of from about 10 to about 200 mole percent of the alcohol, in the presence of a catalyst selected from at least one of tertiary amines and a Group IVA, IB, IVB, VB, VIB, VII organometal compound selected from the group consisting of metal alkyls, metal phenols, metal amides, alkoxides, and glycoxides.

3,965,076

## PROCESS FOR THE PRODUCTION OF MODIFIED CIS-14,-POLYISOPRENE

Junnosuke Yamauchi; Takayuki Okamura, and Shobu Minatono, all of Kashima, Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

Filed July 12, 1974, Ser. No. 488,059
Claims priority, application Japan, July 13, 1973, 48-79449
Int. Cl.² C08F 8/46; C08L 9/00
U.S. Cl. 260—42 11 Claims

1. A process for the production of a modified cis-1,4-polyisoprene rubber having high green strength, which comprises adding an aromatic hydrocarbon having 6 to 12 carbon atoms to the solution of cis-1,4-polyisoprene rubber resulting from the solution polymerization of isoprene in a saturated aliphatic hydrocarbon having 4 to 10 carbon atoms or a saturated alicyclic hydrocarbon having 6 to 10 carbon atoms, the said aromatic hydrocarbon being added in an amount of from about 10 to 50% by volume, based on the total volume of the resulting cosolvent, and thence adding maleic anhydride thereto in an amount of from about 0.1 to 20 parts by weight thereof per 100 parts by weight of said rubber, whereby the reaction between said rubber and maleic anhydride efficiently proceeds, with concomitant gel formation being suppressed.

10. The product of the process as defined by claim 1.

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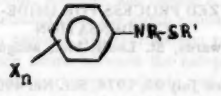
3,965,077

## CYCLOALKYLTHIO(ELECTRON-WITHDRAWING GROUP SUBSTITUTED)ANILINE COMPOUNDS

Pyong-Nae Son, Akron, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Division of Ser. No. 367,643, June 6, 1973, Pat. No. 3,895,060.
This application Feb. 5, 1975, Ser. No. 547,177
Int. Cl.² C08F 28/00, 28/02
U.S. Cl. 260—79.5 P 11 Claims

1. A composition comprising (a) a sulfur-vulcanizable polymer having an olefinic unsaturation content of from about 0.1 to about 45% by weight of the polymer, (b) sulfur or a sulfur donor, (c) a vulcanization accelerator, and (d) a cycloalkylthio aniline of the formula




wherein X is an electron-withdrawing group selected from the group consisting of —Cl, —Br, —I, —F, $-SO_3R_a$, $-NO_2$, and $-COOR_a$ wherein $R_a$ is an alkyl radical containing 1 to 18 carbon atoms, *n* is an integer from 2 to 4, R is selected from the group consisting of hydrogen, an alkyl radical containing 1 to about 8 carbon atoms, a phenyl radical which can be substituted with $-X_n$ groups, and —SR′, and R′ is a cycloalkyl radical containing 4 to 8 carbon atoms in the ring.

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3,965,078

## PROCEDURE FOR THE PRODUCTION OF POLYMERS AND COPOLYMERS OF ISOBUTYLENE

Aldo Priola; Sebastiano Cesca, and Giuseppe Ferraris, all of San Donato, Italy, assignors to Snam Progetti S.p.A., San Donato, Milan, Italy

Continuation of Ser. No. 306,911, Nov. 15, 1972, abandoned.
This application Sept. 6, 1974, Ser. No. 503,599
Claims priority, application Italy, Nov. 26, 1971, 31725/71
Int. Cl.² C08F 4/52, 210/12
U.S. Cl. 526—154 6 Claims

1. Process for the production of copolymers of isobutylene and a conjugated diene wherein the copolymerization reaction is conducted in the presence of a catalyst system consisting of:

a. a metalorganic compound of aluminum having the formula $AlR_2X$, wherein X is a halogen atom and R is a hydrocarbon radical having from 1 to 10 carbon atoms or hydrogen; and

b. a compound selected from the group consisting of $Ti(OnC_4H_9)Cl_3$, $Ti(OCOCH_3)_2Cl_2$, $Si(CH_3)Cl_3$, $SiHCl_3$, $Sn(C_2H_5)_2Cl$, $Sn(C_2H_5)Cl_3$, $Sn(CH_3)_2Cl_2$, $Sn(C_6H_5)_2Cl$, $Sn(OCOCH_3)_2Cl_2$ and $Sn(C_2H_5)Cl_3$.

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3,965,079

## SEPARATION AND RECOVERY OF PRODUCTS OBTAINED IN CATALYTIC PROCESSES OF PREPARING ACRYLONITRILE POLYMERS OR COPOLYMERS

Luciano Console, Mirano; Enzo Chiellini, Rosignano Solvay, and Benedetto Calcagno, Milan, all of Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed July 8, 1974, Ser. No. 486,735
Claims priority, application Italy, July 7, 1973, 26269/73
Int. Cl.² C08F 4/40, 6/00, 20/44
U.S. Cl. 526—68 2 Claims

1. A method of separating and recovering both sulphur dioxide and unreacted monomer from the polymer or copolymer slurry obtained from polymerizing acrylonitrile monomer or from copolymerizing a mixture of acrylonitrile monomer and a further ethylenically unsaturated monomer copolymerizable therewith, the polymerizing or copolymerizing occurring in an aqueous medium and in the presence of a catalytic redox system which includes sulphur dioxide or a sulfite in combination with a compound selected from the group consisting of peroxides, persulfates and chlorates; said method comprising the steps of

1. admixing with said slurry a polymerization inhibitor and a mineral acid for adjusting the pH of said slurry to 1.8 to 2.5;
2. removing sulphur dioxide from said slurry by volatilization in a first vaporization stage conducted at a pressure of from 60 to 150 mm mercury and at a slurry temperature of from 40° to 60°C;
3. scrubbing the sulphur dioxide vapors obtained from (2) with water having a temperature of from 1° to 15°C, and recycling the aqueous solution obtained to the polymerization or copolymerization medium;
4. thereafter, removing unreacted monomer from said slurry by volatization in a second vaporization stage conducted at a pressure of from 1 to 60 mm mercury and at a slurry temperature of from 30° to 55°C; and
5. scrubbing vapors obtained from (4) with water having a temperature of from 1° to 30°C, and recycling the aqueous solution obtained to the polymerization or copolymerization medium.

3,965,080

## POLYMERIZATION OF MONOMERS WITH ALKALINE EARTH METAL ORGANOMETALLIC COMPOUNDS

Ivan Glen Hargis, Tallmadge, and Russell Anthony Livigni, Akron, both of Ohio, assignors to The General Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 328,583, Feb. 1, 1973, Pat. No. 3,928,302, which is a continuation-in-part of Ser. No. 69,476, Sept. 3, 1970. This application Feb. 27, 1975, Ser. No. 553,716
Int. Cl.² C08F *1/28*; C08D *1/18*; C08F *3/76*
U.S. Cl. 526—183 16 Claims

1. The method which comprises polymerizing at a temperature of from about −90° to 100°C. a polymerizable monomer selected from the group consisting of methyl acrylate, ethyl acrylate, butyl acrylate, ethyl hexyl acrylate, octyl acrylate, methyl methacrylate, ethyl methacrylate, butyl methyacrylate, methyl ethacrylate, ethyl ethacrylate, butyl ethacrylate, octyl ethacrylate, acrylonitrile, methacrylonitrile, butadiene, isoprene, dimethyl butadiene, styrene, metavinyl toluene and paravinyl toluene and mixtures of the same with at least one diorgano-metallic catalyst where the metal of said catalyst is selected from the group consisting of barium, strontium and calcium and mixtures thereof and where the organic moiety of said catalyst is selected from the group consisting of triphenyl methane, 1,3,3-triphenyl propene, bis(2-methoxy phenyl) methane, 1,1,2-triphenyl ethane, and 1,1-diphenyl alkanes in which the alkane group has from 1 to 10 carbon atoms and mixtures thereof, said metal being joined to said organic moiety by an ionic carbon to metal bond.

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3,965,081

## ISOTACTIC AND SYNDIOTACTIC POLYVINYL NITRATES AND PROCESSES FOR THEIR FORMATION

Richard A. Strecker, Feasterville, and Frank D. Verderame, Huntingdon Valley, both of Pa., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 21, 1974, Ser. No. 435,344
Int. Cl.² C08F *126/02*, *8/30*
U.S. Cl. 526—9 3 Claims

1. Stereoregular polyvinyl nitrate.

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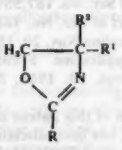
3,965,082

## COMPOSITIONS OF POLYSTYRENE REACTED WITH HEXAMETHOXYMETHYLMELAMINE

Louis A. Jurisch, Morengo, Ill., assignor to Commercial Solvents Corporation, Terre Haute, Ind.

Division of Ser. No. 406,760, Oct. 15, 1973, Pat. No. 3,929,748. This application Sept. 2, 1975, Ser. No. 609,340
Int. Cl.² C08F *112/08*
U.S. Cl. 526—19 4 Claims

1. A resinous compound prepared by polymerizing styrene in the presence of ammonium persulfate and an oxazoline corresponding to the formula:



wherein $R^1$ and $R^2$ are hydrogen, methyl, ethyl, hydroxymethyl or the group $RCOOCH_2$- and at least one of $R^1$ or $R^2$ is hydroxymethyl, and where R is an alkyl group of 1 to 19 carbons and further reacting said resinous compound with hexamethoxymethylmelamine at 400°F.

3,965,083

## PROCESS FOR THE VAPOR PHASE POLYMERIZATION OF MONOMERS IN A HORIZONTAL, QUENCH-COOLED, STIRRED-BED REACTOR USING ESSENTIALLY TOTAL OFF-GAS RECYCLE AND MELT FINISHING

James L. Jezl, St. Charles; Edwin F. Peters, Winfield; Robert D. Hall, Wheaton, and John W. Shepard, Naperville, all of Ill., assignors to Standard Oil Company, Chicago, Ill.

Filed Dec. 16, 1974, Ser. No. 533,018
Int. Cl.² C08F *2/34*, *2/36*, *6/02*, *10/00*
U.S. Cl. 526—65 27 Claims

1. A process for continuously polymerizing from the vapor state at least one polymerizable monomer comprising:

a. introducing said monomer into one or more vapor recycle inlets which are spaced along, and a majority of which are located below, a sub-fluidized bed of polymer distributed within a stirred, horizontal reactor operating at polymerization conditions, said reactor containing one or more individually polymerization-temperature-controllable polymerizable sections;

b. introducing at least one catalyst component into one or more inlets spaced along said reactor and quench liquid into a plurality of inlets spaced along the top of said reactor so that said at least one catalyst component and said quench liquid are intimately mixed with said bed of polymer;

c. removing without substantial pressure letdown polymer from said polymer bed to a post-polymerization zone into which a controlled amount of said monomer is introduced and wherein a controlled amount of essentially adiabatic polymerization takes place and said polymer is melted to form easily transferable molten polymer;

d. removing off-gases from said reactor through one or more reactor off-gas outlets spaced along the top of said reactor and removing entrained polymer therefrom and condensing quench liquid from said off-gases in a separation zone to form a liquid recycle and a gaseous recycle;

e. returning said gaseous recycle to said one or more vapor recycle inlets;

f. taking off a first portion of said liquid recycle containing any entrained polymer remaining in said off-gases and introducing said first portion through said plurality of inlets into said reactor;

g. taking off a second smaller portion of said liquid recycle and using said second portion for make-up of at least one catalyst component;

h. introducing make-up of said quench liquid into said reactor;

i. decomposing the catalyst components contained in the molten polymer of (c) with a kill substance;

j. treating the product of (i) to remove volatile components therefrom; and

k. cooling the polymer product of (j) to ambient temperature.

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3,965,084

## ASHLESS DISPERSANT PRODUCTS AND PROCESS

Sidney Schiff, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 503,800, Sept. 6, 1974, Pat. No. 3,909,421. This application May 12, 1975, Ser. No. 576,940
Int. Cl.² C07C *127/00*
U.S. Cl. 260—96.5 R 10 Claims

1. As a new composition of matter, oil-soluble reaction product obtained upon reacting for a time and under conditions of temperature and pressure to produce said reaction product;

a. A petroleum sulfonic acid with

b. an adduct formed from

1. at least one amine selected from primary monoamines having from 2 to 10, inclusive, carbon atoms, and polyamines represented by the formula $H_2N[(CH_2)$-

$_xNH]_yH$ wherein $x$ is an integer of from 2 to 6 and $y$ is an integer of from 1 to 10, and

2. urea or thiourea.

6. A process for producing additives for lubricants and motor fuels which comprises the steps of

introducing an amine selected from primary monoamines having from 2 to 10, inclusive, carbon atoms, and polyamines represented by the formula $H_2N[(CH_2)_xNH]_yH$ wherein x is an integer of from 2 to 6 and y is an integer of from 1 to 10, and either urea or thiourea into a reaction zone and maintaining temperature and pressure for a time sufficient for forming an adduct from said amine and either urea or thiourea,

introducing a petroleum sulfonic acid into said reaction zone containing said adduct,

interacting said petroleum sulfonic acid and said adduct in said reaction zone "at a temperature and pressure for a time sufficient to produce said additives", and

recovering said additive from the resulting reaction mixture.

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## 3,965,085
## METHOD FOR REFINING OF SOAPS USING SOLVENT EXTRACTION

**Bjarne Holmbom, Tarkkampujankatu 14, 20500 Turku 50, and Eero Avela, Pyorokiventie 10, 00830 Helsinki 83, both of Finland**

**Filed June 24, 1974, Ser. No. 482,564**

**Claims priority, application Finland, June 29, 1973, 2102/73**

**Int. Cl.² C09F *1/02*; C11C *1/00*, *1/02***

**U.S. Cl. 260—97.6** **9 Claims**

1. In a method for refining of soaps of the type of crude sulphate soap and soap obtained during alkali treatment of wood extractives, products of tall oil or products of vegetable oils, in which unsaponifiable neutral substances included in the soap are separated by means of extraction with organic solvents; the improvement comprising dissolving the soap in a mixture of acetone and water to form a soap solution and extracting unsaponifiable substances from said solution with water-immiscible solvent thereby to form an organic phase containing unsaponifiable neutral substances and a water phase containing salts of fatty and resin acids, separating said phases, removing from said organic phase said neutral substances, and removing from said water phase an oil with a high content of free fatty and/or resin acids.

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## 3,965,086
## PROCESS FOR PRODUCING PROTEIN CONCENTRATE (CASE) 1 USING AIR CLASSIFICATION

**Ronald Bruce Swain, Walnut Creek, Calif., and David Evans O'Connor, Greenhills, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Continuation-in-part of Ser. No. 418,348, Nov. 23, 1973, abandoned, which is a continuation-in-part of Ser. No. 157,052, June 25, 1971, abandoned. This application Jan. 3, 1975, Ser. No. 538,280**

**Int. Cl.² A23J *1/14***

**U.S. Cl. 260—123.5** **16 Claims**

1. A process for producing a protein concentrate which comprises the steps of:

a. fine grinding an oilseed meal so that 90% of the particles obtained thereby are less than 100 microns in diameter and air-classifying the resulting ground meal into a fraction which is characterized by its relatively high protein content and relatively low water-insoluble carbohydrate content; and

b. washing said fraction either in water or in a 20% to 80% by weight aqueous alcohol solution wherein the alcohol component of said solution is selected from the group consisting of methanol, ethanol, and isopropanol and separating the protein containing residue from the liquid supernatant.

## 3,965,087
## TRISAZO DYE CONTAINING A DIPHENYLENESULFONE STRUCTURE

**Kenzo Konishi, Nishinomiya; Akira Kotone, Nara; Yoshihiko Nakane, Yao; Teijiro Kitao, Tondabayashi, and Iro Yamase, Osaka, all of Japan, assignors to Sakai Chemical Industry Company Ltd., Sakai, Japan**

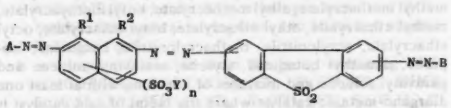
**Filed Mar. 13, 1974, Ser. No. 450,817**

**Claims priority, application Japan, Mar. 14, 1973, 48-29790; Mar. 14, 1973, 48-29791; Apr. 24, 1973, 48-46945**

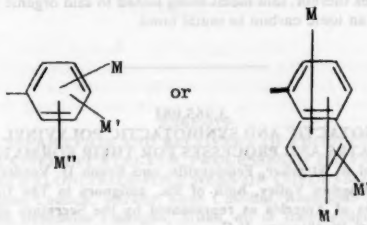
**Int. Cl.² C09B *35/46***

**U.S. Cl. 260—152** **3 Claims**

1. A polyazo dye of the formula



wherein A is phenyl, naphthyl or phenyl or naphthyl substituted with chlorine, lower alkyl, lower alkoxy, amino, carboxy, nitro, $SO_3H$ or $SO_3Na$; B is



where M is $NH_2$, OH or $SO_3H$; M′ and M″ are the same or different and are H, $NO_2$, lower alkyl, $SO_3H$, $SO_3Na$ or $N(R^6)_2$, wherein the members $R^6$ are independently H, lower alkyl or phenyl substituted with lower alkyl; Y is hydrogen, alkali metal, or $NH_4$; $n$ is 1 or 2; and one of $R^1$ and $R^2$ is hydroxy and the other is amino.

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## 3,965,088
## NAPHTHACENE DERIVATIVES

**Georges Jolles, Sceaux, France, assignor to Rhone-Poulenc S.A., Paris, France**

**Continuation-in-part of Ser. No. 187,559, Oct. 7, 1971, which is a continuation-in-part of Ser. No. 768,532, Oct. 17, 1968, abandoned. This application Nov. 20, 1972, Ser. No. 307,955**

**Claims priority, application France, Oct. 18, 1967, 67.124943; Finland, Sept. 19, 1968, 2648/68; Netherlands, Oct. 11, 1968, 6814582**

**The portion of the term of this patent subsequent to May 18, 1993, has been disclaimed.**

**Int. Cl.² C07H *15/00***

**U.S. Cl. 260—210 R** **1 Claim**

1. The naphthacene derivative which is 4-methoxy-5,12-dioxo-6,9,11-trihydroxy-7-(2,3,6-O-tridesocy-3-amino-1-L-lyxohexosyl)-9-(1-formylhydrazonoethyl)-5,7,8,9,10,12-hexahydronaphthacene, and non-toxic acid addition salts thereof.

3,965,089

## PROCESS FOR THE PRODUCTION OF A CYCLIC UREIDO-DERIVATIVE OF A DEOXYSTREPTAMINE-CONTAINING ANTIBIOTIC AND PRODUCTS THEREOF

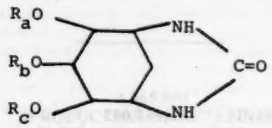
Hamao Umezawa; Kenji Maeda, both of Tokyo; Shinichi Kondo, Yokohama, and Shunzo Fukatsu, Tokyo, all of Japan, assignors to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai, Tokyo, Japan

Filed Mar. 12, 1973, Ser. No. 340,311

Int. Cl.² C07H *15/22*

U.S. Cl. 260—210 AB 17 Claims

1. The cyclic ureido-derivative of a deoxystreptamine-containing antibiotic of the formula:



wherein $R_a$ is an aminoglycoside present in the molecule other than on the deoxystreptamine moiety thereof, $R_b$ and $R_c$ are each hydrogen or an aminoglycoside present in the molecule of the antibiotic other than on the deoxystreptamine moiety thereof.

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3,965,090

## AMPHOTERICIN COMPLEXES

Julio Metzger, East Brunswick, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 338,122, March 5, 1973, abandoned, which is a division of Ser. No. 203,037, Nov. 29, 1971, abandoned. This application Feb. 18, 1975, Ser. No. 550,313

Int. Cl.² A61K *31/71*; C07G *11/00*

U.S. Cl. 260—210 AB 4 Claims

1. A crystalline amphotericin B complex comprising about 1 mole of amphotericin B and from about 0.5 to about 20 moles of succinic acid, the complex having a solubility in water at pH 2 of about 28 grams per liter, and a U.V. absorption at 405 millimicrons ($E_1^1$) in methanol of 1649.

2. A method for preparing a crystalline amphotericin B complex which comprises reacting from about 0.5 to about 20 moles of succinic acid with one mole of amphotericin B, the resulting complex having a solubility in water at pH 2 of about 28 grams per liter, and a U.V. absorption at 405 millimicrons ($E_1^1$) in methanol of 1649.

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3,965,091

## PROCESS FOR THE PRODUCTION OF WATER-ADSORBING BUT WATER-INSOLUBLE CELLULOSE ETHERS

Arno Holst, Wiesbaden-Biebrich, and Helmut Lask, Wiesbaden-Schierstein, both of Germany, assignors to Hoechst Aktiengesellschaft, Germany

Filed Nov. 18, 1974, Ser. No. 524,822

Claims priority, application Germany, Nov. 22, 1973, 2358150

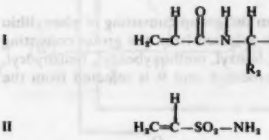
Int. Cl.² C08B *11/00*, *11/20*, *11/193*, *15/10*

U.S. Cl. 260—231 A 10 Claims

1. In the process for the production of water-adsorbing, but largely water-insoluble, cellulose ethers, in which cellulose is alkalized in the presence of alkali and isopropanol as a reaction medium and is so reacted with an etherification agent that by etherification only a water-soluble cellulose ether is produced, and in which process a modification agent which is able to react with the still free hydroxyl groups of the cellulose anhydro glucose groups in an alkaline reaction medium is reacted before, during, or after the etherification,

the improvement which comprises effecting the etherification of cellulose to carboxymethyl cellulose, carboxymethyl hydroxyethyl cellulose, hydroxyethyl cellulose, or methylhydroxyethyl cellulose, reacting with the modification agent in the presence of 0.8 to 7.5 parts by weight of isopropanol, based upon the cellulose weight,

and employing a modification agent which has one of the formulae



I and II

$R_1$ in formula I being hydroxyl, or an acylamino or etherified carbamino group, and

$R_2$ in formula I being hydrogen or a carboxyl group.

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3,965,092

## PERFLUOROALKYL BENZODIAZEPINES

Aimé Cambon, Nice; Claude Giovannoni, Salindres; Raphaël Pastor, and Jean Riess, both of Nice, all of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

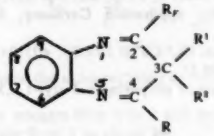
Filed May 21, 1974, Ser. No. 471,837

Claims priority, application France, May 22, 1973, 73.18488

Int. Cl.² C07D *243/12*

U.S. Cl. 260—239 BD 2 Claims

1. A perfluoroalkylated benzodiazepine having the formula



wherein $R_f$ is a $C_1$– $C_{15}$ perfluoro straight chain alkyl group and R is the same as $R_f$ or a different $C_1$– $C_{15}$ perfluoro straight chain alkyl group or a phenyl group or a phenyl group substituted by a $C_1$– $C_4$ alkyl group; wherein $R^1$ and $R^2$ are, independently of each other, hydrogen or $C_1$– $C_5$ alkyl groups; and wherein the benzene ring is unsubstituted in positions 6, 7, 8 and 9 or substituted by a $C_1$– $C_4$ alkyl group in one or both of positions 7 and 8.

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3,965,093

## 6-ARYLTHIO PENICILLANIC ACID AND DERIVATIVES THEREOF

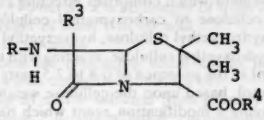
Joseph Edward Dolfini, Princeton; Ekkehard Bohme, Hightstown, and William A. Slusarchyk, Belle Mead, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 183,642, Sept. 24, 1971, Pat. No. 3,855,233. This application Aug. 26, 1974, Ser. No. 500,435

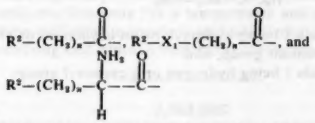
Int. Cl.² C07D *499/44*

U.S. Cl. 260—239.1 4 Claims

1. A compound of the formula



wherein $R^3$ is selected from the group consisting of phenylthio and nitrophenylthio; $R^4$ is selected from the group consisting of hydrogen, lower alkyl, benzyl, methoxybenzyl, benzhydryl, trimethylsilyl, and trichloroethyl; and R is selected from the group consisting of



2 wherein *n* is zero or one, $X_1$ is O or S, and $R^2$ is selected from the group consisting of thienyl, phenyl, and mono and disubstituted phenyl and thienyl wherein said substituents are selected from the group consisting of chloro, bromo, nitro, lower alkyl, and lower alkoxy; and pharmaceutically acceptable salts thereof.

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**3,965,094**

## PROCESS FOR THE MANUFACTURE OF 2-ARYL-V-TRIAZOLE

**Uwe Claussen, Leverkusen; Heinrich Gold, Schildgen, and Josef Schroeder, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

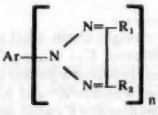
**Filed Mar. 2, 1973, Ser. No. 337,559**

**Claims priority, application Germany, Mar. 3, 1972, 2210261**

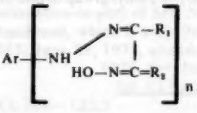
**Int. Cl.² C07D *249/06*, *405/04***

**U.S. Cl. 260—240 C** **7 Claims**

1. In the process of preparing a 2-aryl-1,2,3-triazole of the formula



by heating an α-oximino hydrazone of the formula



in which

Ar is an aromatic-carbocyclic or aromatic-heterocyclic radical;

$R_1$ is $C_1$–$C_4$-alkyl; $C_1$–$C_4$-alkyl substituted by halogen, OH, COOH or $C_1$–$C_4$-alkoxy; phenyl; or phenyl substituted by halogen, $C_1$–$C_4$-alkyl or $C_1$–$C_4$-alkoxy; and

$R_2$ is hydrogen or $R_1$; and

*n* is the number 1 or 2;

the improvement comprising carrying out the reaction in the presence of at least 2 equivalents of

Q — NCO or Z — NH — COCl

in which

Q is hydrogen; $C_1$–$C_6$-alkyl; $C_5$–$C_7$-cycloalkyl; phenyl; phenyl substituted by halogen, $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy or nitro; phenylcarbonyl or phenylsulphonyl; and

Z is $C_1$–$C_6$-alkyl, phenyl, tolyl, or chlorophenyl; or in the presence of at least 1 equivalent of pyrocarbonic acid methyl or ethyl ester.

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**3,965,095**

## OXINDOLE DERIVATIVES

**Fritz Seemann, Basel, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland**

**Filed June 18, 1973, Ser. No. 370,764**

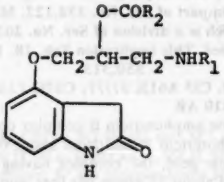
**The portion of the term of this Patent subsequent to July 23, 1991, has been disclaimed.**

**Claims priority, application Switzerland, June 23, 1972, 9522/72**

**Int. Cl.² C07D *209/34***

**U.S. Cl. 260—240 J** **30 Claims**

1. A compound of the formula:



wherein $R_1$ is (i) alkyl of 1 to 4 carbon atoms, (ii) cycloalkyl of 3 to 8 carbon atoms, (iii) phenylalkyl of 8 to 12 carbon atoms in the aggregate thereof, the phenyl ring thereof being separated from the nitrogen atom by at least two carbon atoms, (iv) phenyl alkyl of 8 to 12 carbon atoms in the aggregate thereof, the phenyl ring thereof being separated from the nitrogen atom by at least two carbon atoms and being monosubstituted by alkoxy or alkyl of 1 to 4 carbon atoms, (v) alkenyl or alkinyl of 3 to 7 carbon atoms, or (vi) alkoxycarbonylalkyl, the alkyl moiety having 1 to 6 carbon atoms and the alkoxy moiety having 1 to 4 carbon atoms, and

$R_2$ is (i) phenyl, (ii) phenyl monosubstituted by halogen, alkyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms, (iii) phenylalkyl of 7 to 12 carbon atoms in the aggregate thereof or styryl, (iv) phenylalkyl of 7 to 12 carbon atoms in the aggregate thereof or styryl, monosubstituted in the phenyl ring thereof by halogen, alkyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms, (v) pyridyl or thienyl (vi) alkoxycarbonylalkyl, the alkyl moiety having 1 to 6 carbon atoms and the alkoxy moiety having 1 to 4 carbon atoms, (vii) adamantyl, (viii) haloalkyl of 2 to 12 carbon atoms, the halogen thereof being located in other than the α position, or, when $R_1$ is alkenyl of 3 to 7 carbon atoms (ix) alkyl of 1 to 12 carbon atoms, cycloalkyl of 3 to 6 carbon atoms, or cycloalkyl of 3 to 6 carbon atoms mono- or poly-substituted by alkyl of 1 to 4 carbon atoms, furyl or tetrahydropyranyl or

a pharmaceutically acceptable acid addition salt thereof.

## 3,965,096
## ULTRAVIOLET AND THERMALLY STABLE POLYMER COMPOSITIONS

Ronald F. Reinisch, Palo Alto; Hermilo R. Gloria, San Jose; Ronald E. Goldsberry, San Jose, and Michael J. Adamson, San Jose, all of Calif., assignors to The United States of America as represented by the Administrator of the United States National Aeronautics and Space Administration, Washington, D.C.

Division of Ser. No. 321,179, Jan. 5, 1973, Pat. No. 3,803,090.
This application Nov. 8, 1973, Ser. No. 414,043
Int. Cl.² C07C *119/00*
U.S. Cl. 260—240 G 7 Claims

1. As a new composition of matter:
2,2′,6,6′-tetrahydroxynaphthalazine (2,2′,6,6′-THNZ).

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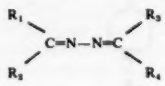
## 3,965,097
## PRODUCTION OF KETAZINES

Kurt-Wilhelm Eichenhofer, Leverkusen, and Reinhard Schliebs, Cologne, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Mar. 6, 1975, Ser. No. 556,036
Claims priority, application Germany, Mar. 27, 1974, 2414802
Int. Cl.² C07C *109/00*
U.S. Cl. 260—240 G 10 Claims

1. A process for the production of a ketazine of the formula

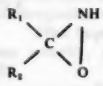


in which

$R_1$, $R_2$, $R_3$ and $R_4$ each independently is an alkyl, cycloalkyl or aralkyl radical with up to 12 carbon atoms; or an aryl radical with up to 10 carbon atoms, at most two of the radicals $R_1$, $R_2$, $R_3$ and $R_4$ being aryl radicals, or

$R_1 + R_2$ and $R_3 + R_4$ individually is an alkylene radical with from 5 to 10 carbon atoms,

which comprises reacting a 3,3-diorganyl oxaziridine of the formula



with ammonia in the presence of a ketone of the formula

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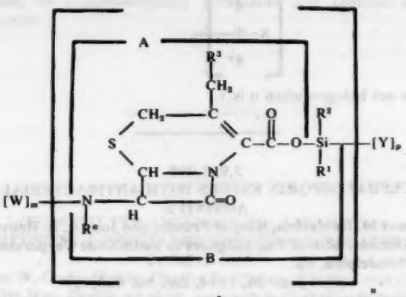
## 3,965,098
## INTERMEDIATES FOR PREPARING CEPHALOSPORINS AND METHODS OF PRODUCTION

Charles A. Robinson, West Chester, Pa., assignor to American Home Products Corporation, New York, N.Y.

Filed Nov. 29, 1972, Ser. No. 310,511
Int. Cl.² C07B *501/02*
U.S. Cl. 260—243 C 13 Claims

1. A compound of the group consisting of those having the following formula:



I

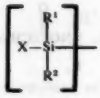
wherein:

$R^1$ is of the group consisting of hydrogen, lower alkyl, phenyl, loweralkylphenyl and benzyl

$R^2$ is of the group consisting of lower alkyl, phenyl, loweralkylphenyl and benzyl

$R^3$ is hydrogen or

$R^a$ is of the group consisting of hydrogen, 2-thienylacetyl, phenylglycyl, dihydrophenylglycyl, 2-furylacetyl, phenylglycolyl, phenylacetyl and phenoxyacetyl; W is of the group consisting of hydrogen and



II

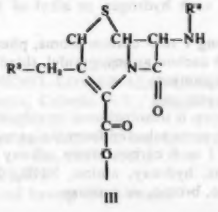
wherein

$R^1$ and $R^2$ have the same meaning as before, and X is halogen;

*m* and *p* are integers from 0 to 1 and are always equal

*n* is an integer from 1 to about 25;

Y is of the group consisting of halogen, and groups of the following formula:



III

wherein $R^a$ has the same meaning as before; with the provisos that, in Formula I,

1. when m is o and p is O, n is more than 1;
2. when n is more than 1, the moieties A of the additional groups B recur in ramdom head-toward-head, head-toward-tail and tail-toward-tail disposition;
3. when W is hydrogen, n is 1, and Y is Formula III, then $R^a$ is hydrogen
4. when W is hydrogen or

Y is not halogen when n is 1.

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**3,965,099**

## CEPHALOSPORIN ESTERS WITH ANTIBACTERIAL ACTIVITY

**Robert M. DeMarinis, King of Prussia, and John R. E. Hoover, Glenside, both of Pa., assignors to SmithKline Corporation, Philadelphia, Pa.**

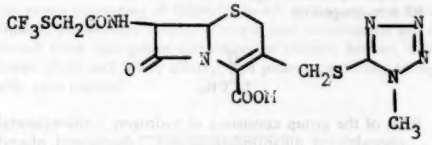
**Filed June 26, 1974, Ser. No. 483,189**

**The portion of the term of this patent subsequent to Aug. 6, 1991, has been disclaimed.**

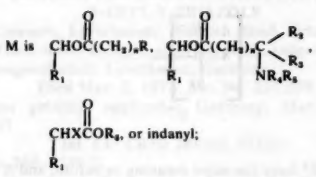
**Int. Cl.² C07D *501/50*; A61K *31/545***

**U.S. Cl. 260—243 C** **14 Claims**

1. A compound of the formula



wherein:



*n* is 0 to 4;

R is hydrogen, alkyl having 1 to 8 carbon atoms, cycloalkyl of 3 to 6 carbon atoms, phenyl, $C_1$–$C_4$ phenalkyl, pyridyl, thienyl, or pyrrolyl;

$R_1$ is hydrogen, methyl or ethyl;

$R_2$ and $R_3$ are each hydrogen, alkyl having 1 to 6 carbon atoms, phenyl, pyridyl, or thienyl;

$R_4$ and $R_5$ are each hydrogen or alkyl of 1 to 4 carbon atoms;

$R_6$ is alkyl having 1 to 4 carbon atoms, phenyl, phenalkyl having 1 to 4 carbon atoms, pyridyl, thiadiazolyl, amino or $C_1$ –$C_4$ alkylamino;

X is NH or oxygen; and

each phenyl group is unsubstituted or substituted with one or two substituents selected from the group consisting of alkyl having 1 to 6 carbon atoms, alkoxy having 1 to 4 carbon atoms, hydroxy, amino, $NHR_1$, $N(R_1)_2$, nitro, fluoro, chloro, bromo, or carboxy.

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**3,965,100**

## 2,3-DIHYDROCYCLOPENTA[D]PYRIDO[1,2-a]PYRIMIDIN-10(1H)-ONE AND ITS DERIVATIVES

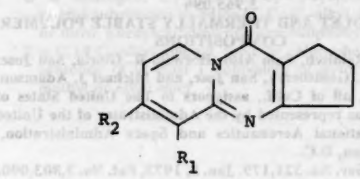
**Harry L. Yale, New Brunswick, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Filed Feb. 26, 1975, Ser. No. 553,341**

**Int. Cl.² C07D *471/04***

**U.S. Cl. 260—251 A** **10 Claims**

1. A compound of the structure



or a pharmaceutically acceptable salt thereof, wherein $R_1$ and $R_2$ are the same or different and are selected from the group consisting of hydrogen, lower alkyl having 1 to 6 carbons, phenyl, phenyl substituted with an alkyl containing 1 to 6 carbons, halo, alkoxy containing 1 to 6 carbons or trifluoromethyl, phenylalkyl the alkyl containing 1 to 6 carbons, halo, hydroxyl, carboxyl, lower alkoxy having 1 to 6 carbons, phenylalkoxy containing 1 to 6 carbons in the alkoxy, carboalkoxy, and carboxamido having the formula R'NHCO wherein R' is hydrogen or lower alkyl having 1 to 6 carbons, one of $R_2$ and $R_1$ being other than hydrogen.

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**3,965,101**

## 1-(O-BROM-OPHENOXYALKYL)-1,2-DIHYDRO-2-IMINOPYRIMIDINES

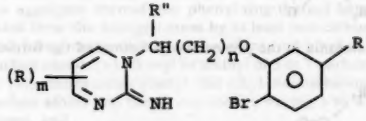
**Harry Louis Yale, New Brunswick, N.J., and Ramesh B. Petigara, Lansdale, Pa., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Division of Ser. No. 382,803, July 26, 1973, Pat. No. 3,868,374. This application Mar. 7, 1975, Ser. No. 556,510**

**Int. Cl.² C07D *239/42***

**U.S. Cl. 260—256.4 H** **3 Claims**

1. A compound of the formula



wherein *m* is 1 or 2; when *m* is 1, R occupies either position-4 or -5 of the starting 2-aminopyrimidine, but when R is halogen it occupies only position-5; when *m* is 2, the two R's occupy the 4- and 5-positions of the starting 2-aminopyrimidine, but only one of the two R-substituents can be halogen and it must occupy the 5-position;

R is the same or different and is hydrogen, F, Cl, Br, alkyl of from 1 to 4 carbons, benzyl, phenyl, or minosubstituted phenyl wherein the substituent is F, Cl, Br, I, alkyl of from 1 to 4 carbons, alkoxy of from 1 to 4 carbons, or trifluoromethyl;

R' is hydrogen, F, Cl, Br, I, alkyl of from 1 to 4 carbons, alkylsulfonyl wherein the alkyl radical has from 1 to 4 carbons, dialkylamidosulfonyl wherein each alkyl radical has from 1 to 4 carbons, trifluoromethyl;

*n* is 0 or 1;

and R'' is hydrogen or alkyl of from 1 to 4 carbons.

3,965,102

## 1,2,3,4,6,7,8,8A-OCTAHYDRO-6-ARYL-ISOQUINOLINES AND DERIVATIVES THEREOF

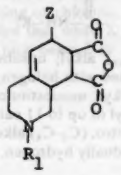
Frederic Peter Hauck, Somerville, N.J., and Joseph E. Sundeen, Yardley, Pa., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 295,386, Oct. 5, 1972, abandoned. This application Oct. 4, 1974, Ser. No. 512,277

Int. Cl.² C07D 217/04, 491/04

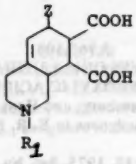
U.S. Cl. 260—286 R 7 Claims

1. A compound of the formula



wherein Z is phenyl or methoxyphenyl; $R_1$ is methyl or benzyl; and a pharmaceutically acceptable salt thereof.

3. A compound of the formula



wherein Z is phenyl or methoxyphenyl; $R_1$ is methyl or benzyl; and a pharmaceutically acceptable acid addition salt thereof.

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3,965,103

## 4-NITROPERHYDROPYRIDO[1,2-A][1,4]DIAZEPINES

Helmut Biere; Hermann Ulbrich; Hans-Joachim Kessler, and Ulrich Redmann, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

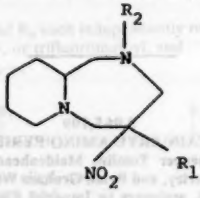
Filed Sept. 20, 1974, Ser. No. 507,684

Claims priority, application Germany, Sept. 20, 1973, 2347886

Int. Cl.² C07D 471/02

U.S. Cl. 260—293.55 27 Claims

1. A compound of the formula



wherein $R_1$ is a hydrogen atom, alkyl of 1—12 carbon atoms, phenyl, hydrocarbon monocycle aralkyl of 7–10 carbon atoms, hydroxyalkyl of 1–4 carbon atoms, or $-(CH_2)_n-X$ wherein n is an integer from 0–4, inclusive and X is alkoxycarbonyl of 1–4 carbon atoms in the alkoxy group, nitrile, or carboxy, and $R_2$ is a hydrogen atom, alkyl of 1—4 carbon atoms or hydrocarbon monocyclic aralkyl of 7—10 carbon atoms, or a physiologically acceptable acid addition salt thereof.

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3,965,104

## 1-(SUBSTITUTED-AMINOALKYL)-3-BENZOYL-4-HYDROXY-4-PHENYLPIPERIDINES AND RELATED COMPOUNDS

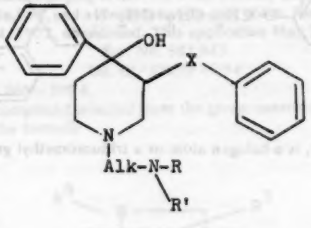
John W. Cusic, Skokie; Charles R. Ellefson, Chicago, and Chi Min Woo, Skokie, all of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Filed June 16, 1975, Ser. No. 587,401

Int. Cl.² C07D 211/52

U.S. Cl. 260—293.64 7 Claims

1. A compound of the formula



(I)

wherein X is hydroxymethylene or keto; Alk is alkylene of 2 to 6 carbon atoms, separating the nitrogen atoms attached thereto by at least 2 carbon atoms; and NRR′ is selected from the group consisting of di(lower alkyl)amino, pyrrolidino, piperidino, and hexamethyleneimino.

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3,965,105

## PHENYL-LOWER-ALKYLAMINES

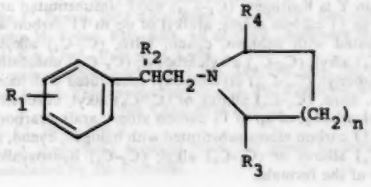
Bernard L. Zenitz, Colonie, N.Y., assignor to Sterling Drug Inc., New York, N.Y.

Filed Jan. 20, 1975, Ser. No. 542,552

Int. Cl.² C07D 211/14

U.S. Cl. 260—293.72 8 Claims

1. A compound having the formula:



where $R_1$ represents hydrogen, lower-alkyl or halogen $R_2$ represents lower-alkyl; $R_3$ represents lower-alkyl or cyclohexyl-lower-alkyl; $R_4$ represents hydrogen or lower-alkyl; and n represents one of the integers 1 and 2.

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**3,965,106**

## 3-PHENOXYPROPYLAMINE DERIVATIVES

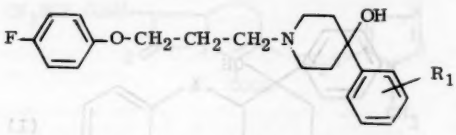
**Isamu Maruyama, Minoo; Masaru Nakao, Osaka; Kikuo Sasajima, Toyonaka; Shigeho Inaba, Takarazuka, and Hisao Yamamoto, Nishinomiya, all of Japan, assignors to Sumitomo Chemical Company, Limited, Japan**

**Filed Dec. 12, 1973, Ser. No. 423,981**

**Int. Cl.² C07D 211/52**

**U.S. Cl. 260—293.83** **6 Claims**

1. A 3-phenoxypropylamine derivative of the formula:



wherein $R_1$ is a halogen atom or a trifluoromethyl group.

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**3,965,107**

## ISOTHIAZOLOPYRIDINONES

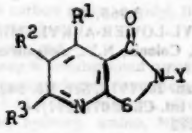
**James L. Rainey, Abington, and Michael C. Seidel, Chalfont, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.**

**Filed July 8, 1974, Ser. No. 486,550**

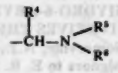
**Int. Cl.² C07D 513/04**

**U.S. Cl. 260—294.8 C** **18 Claims**

1. A compound of the formula:

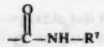


wherein Y is hydrogen; $(C_1–C_{12})$ alkyl; unsubstituted aralkyl of up to 11 carbon atoms; aralkyl of up to 11 carbon atoms substituted with halogen, cyano, nitro, $(C_1–C_4)$ alkoxy or $(C_1–C_6)$ alkyl; $(C_1–C_4)$ alkylcarbonyl; $(C_6–C_{10})$ unsubstituted arylcarbonyl; $(C_6–C_{10})$ arylcarbonyl substituted with halogen, cyano, nitro, $(C_1–C_4)$ alkoxy or $(C_1–C_6)$ alkyl; unsubstituted aralkylcarbonyl of up to 11 carbon atoms; aralkylcarbonyl of up to 11 carbon atoms substituted with halogen, cyano, nitro, $(C_1–C_4)$ alkoxy or $(C_1–C_6)$ alkyl; $(C_2–C_3)$ hydroxyalkyl; a group of the formula:



wherein $R^4$ is hydrogen, $(C_1–C_3)$ alkyl or phenyl and

$R^5$ and $R^6$ are individually $(C_1–C_4)$ alkyl or taken together with the nitrogen atom to which they are attached, form a morpholino or piperidino group; or a carbamoyl group of the formula:



wherein $R^7$ is $(C_1–C_{18})$ alkyl; unsubstituted $(C_6–C_{10})$ aryl; $(C_6–C_{10})$ aryl substituted with halogen, cyano, nitro, $(C_1–C_4)$ alkoxy, or $(C_1–C_6)$ alkyl; unsubstituted aralkyl of up to 11 carbon atoms or aralkyl of up to 11 carbon atoms, substituted with halogen, cyano, nitro, $(C_1–C_4)$ alkoxy, or $(C_1–C_6)$ alkyl;

$R^1$ and $R^2$ are individually hydrogen, $(C_1–C_4)$ alkyl,.phenyl, or benzyl; and

$R^2$ is hydrogen or $(C_1–C_4)$ alkyl; provided that at least one of $R^1$, $R^2$, and $R^3$ is other than hydrogen.

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**3,965,108**

## AMINO DERIVATIVES OF [1,2,3]THIADIAZOLO[5,4-b] PYRIDINE-6-CARBOXYLIC ACIDS AND ESTERS

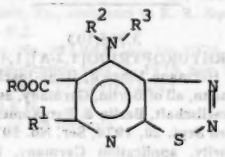
**Theodore Denzel, Regensburg, and Hans Hoehn, Tegernheim, both of Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Filed May 12, 1975, Ser. No. 576,418**

**Int. Cl.² C07D 213/55**

**U.S. Cl. 260—294.8 C** **12 Claims**

1. A compound of the formula



wherein R and $R^1$ each is hydrogen or lower alkyl; and $R^2$ and $R^3$ each is hydrogen, lower alkyl or di (lower alkylamino)-lower alkyl;

and physiologically acceptable acid addition salts thereof.

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**3,965,109**

## CERTAIN ARYL AMINO PYRIDINES

**Clive Dudley Spencer Tomlin, Maidenhead; Charles Brian Barlow, Camberley, and Brian Graham White, Crowthorne, all of England, assignors to Imperial Chemical Industries Limited, London, England**

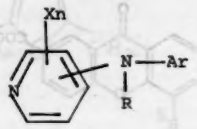
**Division of Ser. No. 230,514, Feb. 29, 1972, Pat. No. 3,926,611. This application Sept. 16, 1975, Ser. No. 613,955**

**Claims priority, application United Kingdom, Mar. 19, 1971, 7291/71**

**Int. Cl.² C07D 213/57**

**U.S. Cl. 260—294.9** **4 Claims**

1. An arylaminopyridine compound of the formula:



or salt thereof whereinn R represents hydrogen; Ar is phenyl or substituted phenyl bearing a substituent selected from the group consisting of chlorine, bromine, fluorine, nitro, cyano, alkyl of 1–4 carbon atoms and trifluoromethyl; X is selected from the group consisting of chlorine, bromine and fluorine; and *n* is 3 or 4; provided that when X is Cl, and *n* is 4, Ar is a substituted phenyl which bears 2 or 3 substituents.

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**3,965,110**

**2-AMINO-5-(TRIFLUOROMETHYL PHENYLALKYL)-1,3,4-THIADIAZOLES**

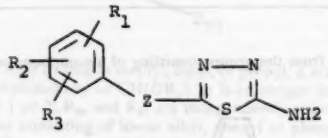
**Marcel K. Eberle, Madison, and Robert E. Manning, Mountain Lakes, both of N.J., assignors to Sandoz, Inc., E. Hanover, N.J.**

**Continuation-in-part of Ser. No. 485,991, July 5, 1974, abandoned, which is a continuation-in-part of Ser. No. 452,678, March 20, 1974, abandoned, which is a continuation-in-part of Ser. No. 218,559, Jan. 17, 1972, abandoned, which is a continuation-in-part of Ser. No. 124,489, March 15, 1971, abandoned. This application Nov. 29, 1974, Ser. No. 528,477**

**Int. Cl.² C07D *285/12***

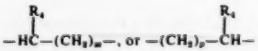
**U.S. Cl. 260—306.8 D** **8 Claims**

1. A compound of the formula



where $R_1$, $R_2$, and $R_3$ each independently represent hydrogen, fluoro or chloro, or trifluoromethyl, and

Z is $-(CH_2)_n-$,



where $R_4$ is lower alkyl, and

*n* is 1, 2, 3, or 4, and

*m* is 0, 1, 2, or 3, and

*p* is 1, 2, or 3,

provided that (a) at least one of $R_1$, $R_2$, and $R_3$ is trifluoromethyl, and (b) that when more than one of $R_1$, $R_2$, and $R_3$ is trifluoromethyl, they are bonded to other than adjacent carbon atoms and (c) where two of the substituents are trifluoromethyl, the remaining substituent is hydrogen,

or a pharmaceutically acceptable acid addition salt thereof.

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**3,965,111**

**TRIAZOLOTHIENODIAZEPINE COMPOUNDS**

**Michio Nakanishi, Oita; Kazuhiko Araki, Fukuoka; Tetsuya Tahara, Fukuoka, and Masami Shiroki, Fukuoka, all of Japan, assignors to Yoshitomi Pharmaceutical Industries, Ltd., Osaka, Japan**

**Filed Oct. 30, 1972, Ser. No. 301,910**

**Claims priority, application Japan, Oct. 30, 1971, 46-86663**

**Int. Cl.² C07D *495/04***

**U.S. Cl. 260—308 C** **6 Claims**

1. 6-o-Chlorophenyl-8-ethyl-1,2-dihydro-4H-s-triazolo[3,4-c]thieno[2,3-e] [1,4] diazepin-1-one.

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**3,965,112**

**IMIDAZOLINE DERIVATIVES**

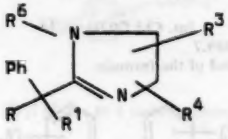
**Alan Chapman White, Windsor, and Robin Michael Black, Porton, both of England, assignors to John Wyeth & Brother Limited, Taplow, England**

**Continuation-in-part of Ser. No. 472,759, May 23, 1974, Pat. No. 3,926,994, and a continuation-in-part of Ser. No. 309,580, Nov. 24, 1972, abandoned. This application May 29, 1975, Ser. No. 582,043**

**Int. Cl.² C07D *49/34***

**U.S. Cl. 260—309.6** **4 Claims**

1. A compound selected from the group consisting of bases having the formula



and the pharmaceutically acceptable acid addition salts thereof, wherein $R^3$ and $R^4$ which may be same or different represent a member of the group consisting of hydrogen and lower alkyl, Ph represents a member of the group consisting of phenyl, halophenyl, lower alkyl phenyl, di(lower alkyl)phenyl) and lower alkoxyphenyl, R is a member of the group consisting of hydroxyl, lower alkoxy and chlorine, $R^1$ is a member of the group consisting of phenyl, halophenyl, lower alkyl phenyl, di(loweralkyl)phenyl, lower alkoxy phenyl and naphthyl and $R^6$ is a member of the group consisting of hydrogen and lower alkyl.

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**3,965,113**

**5(6)-BENZENE RING SUBSTITUTED BENZIMIDAZOLE-2-CARBAMATE DERIVATIVES HAVING ANTHELMINTIC ACTIVITY**

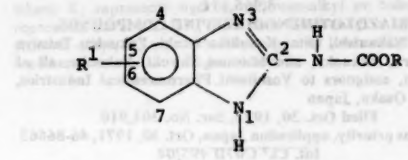
**Colin C. Beard, Palo Alto; John A. Edwards, Los Altos, and John H. Fried, Palo Alto, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.**

**Continuation-in-part of Ser. No. 319,299, Dec. 29, 1972, abandoned. This application Nov. 21, 1973, Ser. No. 417,968**

**Int. Cl.² C07D *235/32***

**U.S. Cl. 260—309.2** **7 Claims**

1. A compound selected from the group of compounds represented by the formula:



where R is lower alkyl group having 1 to 4 carbon atoms; $R^1$ is $-SR^5$ or $-OR^5$; and $R^5$ is naphthyl optionally substituted with a lower alkyl having 1 to 6 carbon atoms, alkoxy having 1 to 6 carbon atoms, halo, nitro, cyano, hydroxy, thiocyanato, isothiocyanato, trifluoromethyl, alkylthio having 1 to 6 carbon atoms, alkylsulfinyl having 1 to 6 atoms, alkylsulfonyl having 1 to 6 carbon atoms, alkanoyl or alkanoylamino where the alkanoyl portion has 1 to 6 carbon atoms, $-SO_2NR^3R^4$ or $-N(R^3)SO_2R^4$ radical; where $R^3$ and $R^4$ are independently hydrogen or lower alkyl having 1 to 6 carbon atoms; the $R^1$ substitution being at the 5(6)-position; and the non-toxic salts thereof.

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**3,965,114**

**IMIDAZOLIDINE DERIVATIVES**

**Willem Jacob van der Burg, Heesch, Netherlands, assignor to Akzona Incorporated, Asheville, N.C.**

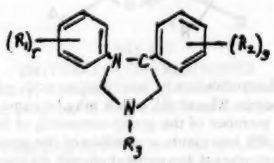
**Filed Sept. 4, 1974, Ser. No. 503,124**

**Claims priority, application Netherlands, Sept. 20, 1973, 7312944**

**Int. Cl.² C07D *49/34***

**U.S. Cl. 260—309.7** **2 Claims**

1. A compound of the formula:



or a pharmaceutically acceptable salt thereof, in which $R_1$ and $R_2$ are selected from the group consisting of halogen, hydroxy, alkyl (1–6 C), alkoxy (1–6 C), and trifluoromethyl,

*r* and *s* stand for the number 0 – 1, and

$R_3$ is alkyl of 1 to 6 carbon atoms.

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**3,965,115**

**DISUBSTITUTED XANTHONE CARBOXYLIC ACID COMPOUNDS**

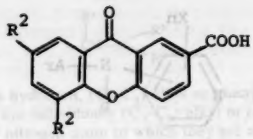
**Jurg R. Pfister, Los Altos; Ian T. Harrison, and John H. Fried, both of Palo Alto, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.**

**Division of Ser. No. 431,794, Jan. 8, 1974, Pat. No. 3,894,049, which is a continuation-in-part of Ser. No. 259,852, June 5, 1972, abandoned, which is a continuation-in-part of Ser. No. 217,287, Jan. 12, 1972, Pat. No. 3,849,565. This application Mar. 13, 1975, Ser. No. 558,025**

**Int. Cl.² C07D *311/86***

**U.S. Cl. 260—335** **8 Claims**

1. A compound selected from those represented by the following formula:



and the pharmaceutically acceptable, non-toxic alkyl or glycerol esters, amides, and salts thereof;

wherein one $R^2$ group is selected from alkyl containing from one to twelve carbon atoms and the other $R^2$ group is selected from the group

in which *n* is the integer 1 or 2, R is lower alkyl when *n* is 1 and R is lower alkyl, hydroxy, amino, monolower alkylamino, or dilower alkylamino when *n* is 2.

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**3,965,116**

**MULTIOXYMACROCYCLES**

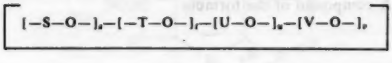
**Donald J. Cram, Los Angeles, Calif., assignor to The Regents of the University of California, Berkeley, Calif.**

**Filed Sept. 12, 1974, Ser. No. 505,576**

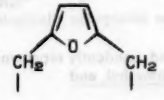
**Int. Cl.² C07D *307/00***

**U.S. Cl. 260—338** **9 Claims**

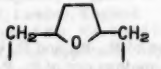
1. A compound of the formula



selected from the group consisting of a compound where —S— is



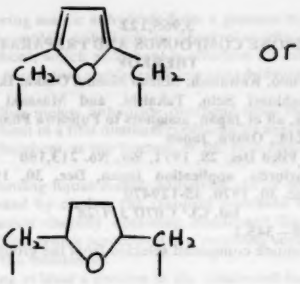
or



, and

s is 2 through 4, and

t, u and v are each zero, and a compound where —S— = U =



each of T and V is $-CH_2-CH_2-$,
s and u are 1,
t is 1 through 6,
v is 0 through 6.

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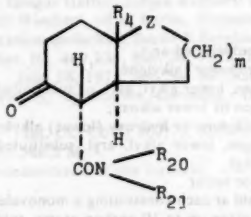
**3,965,117**

## STEREOSPECIFIC TOTAL STEROIDAL SYNTHESIS VIA SUBSTITUTED C/D-TRANS INDANONES

**Zoltan George Hajos, Upper Montclair, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.**

**Division of Ser. No. 765,023, Oct. 4, 1968, Pat. No. 3,897,460. This application June 24, 1974, Ser. No. 482,541**
**Int. Cl.² C07C *103/19***
**U.S. Cl. 260—340.3** **1 Claim**

1. A compound of the formula



wherein $R_4$ is hydrogen methyl, ethyl, or propyl; Z is carbonyl, lower alkylenedioxy or $CH(OR_3)$; m is an integer having the value of 1 or 2; $R_{20}$ and $R_{21}$ are independently selected from the group consisting of lower alkyl, phenyl or phenyl substituted with one member of the group selected from lower alkyl, lower alkoxy, nitro, amine or halogen, and hydrogen, and $R_3$ is hydrogen, lower alkyl, lower alkoxy-lower alkyl, or phenyl-lower alkyl,
its optical enantiomer and the racemate thereof.

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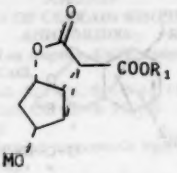
**3,965,118**

## LACTONE INTERMEDIATES

**Verlan H. Van Rheenen, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

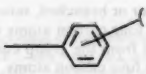
**Division of Ser. No. 273,785, July 21, 1972, Pat. No. 3,823,138. This application Apr. 19, 1974, Ser. No. 462,234**
**Int. Cl.² C07D *307/77***
**U.S. Cl. 260—343.3 R** **6 Claims**

1. An optically active compound of the formula



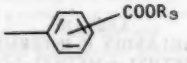
wherein M is carboxyacyl of the formula

wherein $R_2$ is



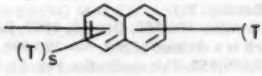
wherein T is alkyl of one to 4 carbon atoms, inclusive, phenylalkyl of 7 to 10 carbon atoms, inclusive, or nitro, and *s* is zero to 5, inclusive, provided that not more than two T's are other than alkyl, and that the total number of carbon atoms in the T's does not exceed 10 carbon atoms;

(2)



wherein $R_3$ is alkyl of one to 4 carbon atoms, inclusive,

(3)



wherein T and s are as defined above, or (4) alkyl of 1 to 4 carbon atoms, inclusive; and wherein $R_1$ is hydrogen, alkyl of 1 to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, phenylalkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with 1, 2, or 3 chloro or alkyl of 1 to 4 carbon atoms, inclusive, or ethyl substituted in the $\beta$-position with 3 chloro.

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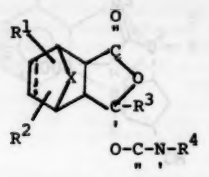
**3,965,119**

## CARBAMATES AND THEIR USE AS PHARMACEUTICALS

**August Amann, Ludwigshafen; Gerhard Bolz, Frankenthal; Walter-Wielant Wiersdorff, Ludwigshafen; Hubert Giertz, Limburgerhof, and Klaus Wilsmann, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany**

**Filed Sept. 13, 1974, Ser. No. 505,756**
**Claims priority, application Germany, Sept. 14, 1973, 2346305**
**Int. Cl.² C07D *307/77, 307/93***
**U.S. Cl. 260—343.3 R** **4 Claims**

1. A compound of the formula (1):



(I)

O H

in which

The dotted line denotes a double bond which may be hydrogenated;

X is $-(CH_2)_n-$ in which $n$ is one of the integers from 1 to 2,

$R^1$ is hydrogen or alkyl of one to four carbon atoms,

$R^2$ is hydrogen,

$R^3$ is hydrogen, and

$R^4$ is hydrogen or a linear or branched, saturated or unsaturated alkyl of one to four carbon atoms which may bear a substituent selected from the group consisting of chlorine, alkoxy of one to four carbon atoms, dialkylamino of one to four carbon atoms in the alkyl, cycloalkyleneimino of five to seven ring members and phenyl.

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**3,965,120**

**PROSTAGLANDIN $E_1$ INTERMEDIATE 3-CARBOXYMETHYL-4-METHYL-2-[1-CARBOXY-7-(LOWERALKOXY OR ARALKOXYCARBONYL)-HEPTYL]-4-HYDROXYBUTYRIC ACID, γ-LACTONE, AND PROCESSES OF THEIR PREPARATION**

**Chan-Hwa Kuo, South Plainfield; David Taub, Metuchen, and Norman L. Wendler, Summit, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.**

**Division of Ser. No. 406,752, Oct. 15, 1973, Pat. No. 3,919,253, which is a division of Ser. No. 290,590, Sept. 20, 1972, Pat. No. 3,850,952. This application Feb. 11, 1975, Ser. No. 549,130**

**Int. Cl.² C07D *307/58***

**U.S. Cl. 260—343.6** **5 Claims**

1. 3-Carboxymthyl-4-methyl-2-[1carboxy-7-(loweralkoxycarbonyl or hydrocarbon ($C_6$–$C_{10}$) aryl lower alkoxycarbonyl)heptyl]-4hydroxy-butyric acid, γ-lactone.

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**3,965,121**

**SALTS OF THE γ-LACTONE OF (-)-THREO-HYDROXYCITRIC ACID WITH R(+)-α-METHYL-p-NITROBENZYLAMINE**

**Clark William Perry, North Bergen, and Sidney Teitel, Clifton, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Division of Ser. No. 404,951, Oct. 10, 1973, Pat. No. 3,901,915. This application May 15, 1975, Ser. No. 577,823**

**Int. Cl.² C07D *307/20***

**U.S. Cl. 260—343.6** **2 Claims**

1. Salts of the γ-lactone of (−)-threo-hydroxycitric acid with R(+)-α-methyl-p-nitrobenzylamine.

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**3,965,122**

**CHROMONE COMPOUNDS AND PREPARATION THEREOF**

**Suminori Umio, Kawanish; Shizuo Maeno, Osaka; Ikuo Ueda, Yao; Yoshinari Sato, Takaishi, and Masaaki Matsuo, Toyonaka, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan**

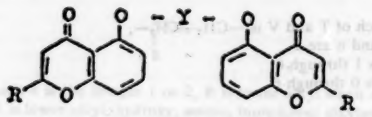
**Filed Dec. 28, 1971, Ser. No. 213,180**

**Claims priority, application Japan, Dec. 30, 1970, 45-129469; Dec. 30, 1970, 45-129470**

**Int. Cl.² C07D *311/28***

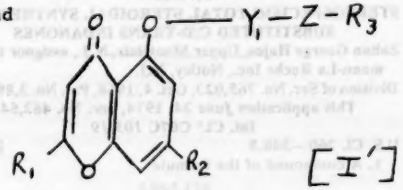
**U.S. Cl. 260—345.2** **8 Claims**

1. A chromone compound selected from the group consisting of



[I]

and



[I']

wherein

R is aryl or substituted aryl,

Y is hydroxy (lower) alkylene,

$R_1$ is hydrogen, lower alkyl, aryl, or substituted aryl,

$R_2$ is hydrogen or lower alkoxy,

$Y_1$ is lower alkylene or hydroxy (lower) alkylene,

$R_3$ is hydrogen, lower alkyl, aryl, substituted aryl or ar (lower) alkyl,

Z is oxygen or sulfur

said aryl and said ar each constituting a monovalent, aromatic hydrocarbon having up to 10 carbon atoms, said substituted aryl being aryl substituted by 1 or more of lower alkoxy, halogen, carboxy, lower alkoxy carbonyl, ar (lower) alkoxy carbonyl, and aryloxy carbonyl.

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**3,965,123**

**MALEIC ANHYDRIDE RECOVERY**

**Frederick C. Franklin, Pinole, Calif., assignor to Chevron Research Company, San Francisco, Calif.**

**Filed June 10, 1974, Ser. No. 477,556**

**Int. Cl.² C07D *307/60***

**U.S. Cl. 260—346.8 M** **3 Claims**

1. A process for recovery of good color stability maleic anhydride which comprises:

a. removing maleic anhydride from a gaseous mixture containing maleic anhydride by absorption into an organic absorbent, which absorbent is effective for maleic anhydride absorption and frees maleic anhydride upon distillation,

b. distilling maleic anhydride overhead from the resulting absorbent in a first distillation column by applying heat to the absorbent at the bottom of the first distillation column,

c. condensing liquid maleic anhydride out of the resulting overhead by cooling the resulting overhead in a partial condenser thereby obtaining condensed liquid maleic anhydride which is received in a receiving vessel separate from the condenser.

d. passing at least a portion of the condensed liquid maleic anhydride from the receiving vessel to the upper part of a second distillation column,

e. distilling material more volatile than maleic anhydride out of the condensed liquid maleic anhydride in the second distillation column by applying heat to bottoms material in the second distillation column, thereby obtaining stripped maleic anhydride which is withdrawn from the lower part of the second distillation column, and vapors which are withdrawn from the top of the second distillation column, and

f. condensing liquid maleic anhydride out of said vapors by cooling said vapors in said partial condenser thereby obtaining condensed liquid maleic anhydride which is received in said receiving vessel, and

g. passing at least a portion of the condensed maleic anhydride from step (*f*) to the first distillation column.

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**3,965,124**

## 6,9-OXIDO-9,10-SECOESTRANE DERIVATIVES AND METHOD OF SYNTHESIS

**Ulrich Eder; Gregor Haffer; Jurgen Ruppert; Gerhard Sauer, and Rudolf Wiechert, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany**

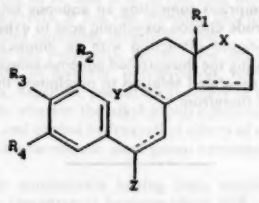
**Division of Ser. No. 409,234, Oct. 24, 1973. This application June 18, 1975, Ser. No. 587,986**

**Claims priority, application Germany, Oct. 25, 1972, 2253088**

**Int. Cl.² C07D** *307/79, 307/80*

**U.S. Cl. 260—346.2 M** **15 Claims**

1. A 9,10-secoestrane of the formula




wherein $R_1$ is lower alkyl; $R_2$, $R_3$ and $R_4$ each are a hydrogen atom, alkoxy of 1–4 carbon atoms or hydrocarbonyloxy of 1–12 carbon atoms; X is carbonyl, dialkoxymethylene wherein the alkoxy groups each contain 1–4 carbon atoms, alkylenedioxymethylene wherein the alkylene group contains 2–6 carbon atoms, phenylenedioxymethylene, hydroxymethylene, alkoxymethylene wherein the alkoxy group contains 1–10 carbon atoms, hydrocarbon aralkoxymethylene wherein the aralkoxy group contains 7–10 carbon atoms, or hydrocarbon carbonyloxymethylene wherein the hydrocarboncarbonyloxy group contains 1–10 carbon atoms; Y and Z collectively are —O—, and the linkages —— each represent a single or double bond.

**3,965,125**

## SYNTHESIS OF CERTAIN BIS(PHTHALIC ANHYDRIDES)

**Robert A. Meyers, Los Angeles, Calif., assignor to TRW Inc., Redondo Beach, Calif.**

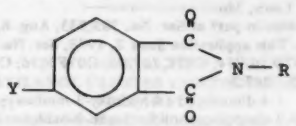
**Filed Feb. 8, 1971, Ser. No. 113,747**

**Int. Cl.² C07D** *307/89*

**U.S. Cl. 260—346.3** **6 Claims**

1. A method of making monomeric high molecular weight anhydrides comprising:

A. i. reacting a substituted phthalimide characterized by the formula:




where Y is a functional group selected from the group consisting of —CL, —F, —Br, and —I, and R is selected from the group consisting of $C_1$ to $C_8$ alkyl groups, phenyl, with (ii) a polyfunctional compound characterized by the formula:

A — Z — A

wherein A is a functional group capable of reacting with Y and is selected from the group consisting of —OLi, —ONa, —OK, —SLi, —SNa, —SK, $-NHC_6H_5$, $-NHCH_3$, $-NHC_2H_5$, $-NHC_3H_7$, $-NHC_4H_9$, $-NHC_5H_{11}$, $-NHC_6H_{13}$, and $-NH_2$ and Z is selected from the group consisting of arylene, alkylene, haloarylene, oxyhisaryl, oxlybisaryl, alkylenebisaryl, nitro substituted anthraquinonylene, azabisoryl, alkyl substituted pyrimidylene, and pyrimidylene sulfonebisaryl to form a diimide terminated cyclic intermediate, and

B. hydrolyzing and subsequently dehydrating said diimide terminated intermediate to the corresponding dianhydride.

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**3,965,126**

## RECOVERING MALEIC ANHYDRIDE FROM THE EFFLUENT FROM THE PRODUCTION OF PHTHALIC ANHYDRIDE

**Friedrich Wirth; Erich Renauer, both of Ludwigshafen; Hans Von Ammon, Gruenstadt; Curt Schneider, Kirchheim, and Hubert Suter, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany**

**Filed Oct. 25, 1974, Ser. No. 517,887**

**Claims priority, application Germany, Nov. 9, 1973, 2356049**

**Int. Cl.² B01D** *1/22, 1/26;* **C07C** *57/14*

**U.S. Cl. 260—346.8 M** **7 Claims**

1. In a process for recovering maleic anhydride formed in the production of phthalic anhydride by catalytic oxidation of o-xylene with air wherein the scrubbing of offgas with water produces an aqueous solution containing up to 40% by weight of maleic acid as well as other oxidation products, the improvement which comprises recovering maleic anhydride from said aqueous solution by:

a. evaporating water from the aqueous solution in at least one stage at a temperature of from 40°C to 150°C and a pressure of from 50 to 760 mm to give a concentrate containing less than 10% by weight of water, and condensing the aqueous vapors;

b. heating the concentrate in a film evaporator at a temperature of from 120° to 180°C and a pressure of from 100 to 600 mm;

c. collecting the condensate obtained by cooling the vapors from said film evaporator to a temperature of from 110° to 140°C, and condensing the aqueous vapors separately at a lower temperature;

d. distilling said condensate collected at 110° to 140°C through a distillation column to produce pure maleic anhydride;

e. returning the combined aqueous condensates to the off-gas scrubber; and

f. removing non-volatile impurities as a residue from the film evaporator.

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3,965,127

## UREA-PHOSPHORUS COMPOUNDS

Gail H. Birum, Kirkwood, Mo., assignor to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 385,933, Aug. 6, 1973, abandoned. This application June 2, 1975, Ser. No. 582,962

Int. Cl.² G07D 307/54; G07C 127/00; G07F 9/36; C07F 9/30

U.S. Cl. 260—347.3 8 Claims

1. 1,4-dimethyl-3-(4-hydroxy-3-methoxyphenyl)-2-phenoxy-1,4,2-diazaphospholidin-5-one-2-oxide.

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3,965,128

## 6β,7β-EPOXY-1α,2α-METHYLEN-D-HOMO-4-PREGNEN-3,20-DIONES

Andor Fürst, Basel; Marcel Müller, Frenkendorf; Leo Alig, Liestal; Peter Keller, Therwil, all of Switzerland; Ulrich Kerb, and Rudolf Wiechert, both of Berlin, Germany, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

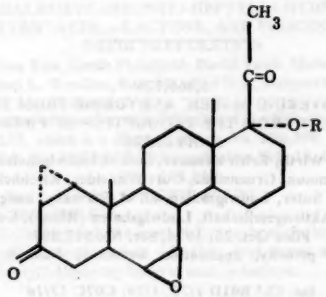
Filed Sept. 23, 1974, Ser. No. 508,492

Claims priority, application Germany, Sept. 26, 1973, 2349024

Int. Cl.² C07D 303/44

U.S. Cl. 260—348 C 4 Claims

1. A compound of the formula




wherein R is hydrogen or a $C_{1-15}$ organic carboxylic acid radical conventionally employed in steroid chemistry as an esterifying agent for hydroxy groups.

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3,965,129

## OPTICAL RESOLUTION OF ORGANIC CARBOXYLIC ACIDS

Clark William Perry, Saddle River, and Sidney Teitel, Clifton, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 404,951, Oct. 10, 1973, Pat. No. 3,901,915. This application May 15, 1975, Ser. No. 577,806

Int. Cl.² G07D 303/38

U.S. Cl. 260—348 A 1 Claim

1. (+)-threo-Epoxyaconitic acid bis-R(+)-α-methyl-p-nitrobenzylamine salt.

3,965,130

## METHOD FOR PREPARING ERGOSTEROL AND UBIQUINONE-9 IN A SINGLE PROCESS

Nina Vasilievna Tarasova, Krasnaya Presnya, 45, kv. 12; Elena Abramovna Obolnikova, Astrakhansky pereulok, 19, korpus 2, kv. 37; Alexandr Dmitrievich Gololobov, Belomorskaya ulitsa, 20, kv. 101; Gleb Ivanovich Samokhvalov, ulitsa M. Ulyanovol, 3, korpus 3, kv. 53; Sergei Vladimirovich Chepigo, Lenigradsky prospekt, 74, korpus 2a, kv. 9; Galina Ivanovna Ivanova, Leninsky prospekt, 93, korpus 4, kv. 130; Vladimir Vasilievich Imshenetsky, Novokuznetsky pereulok, 11/13, kv. 8, and Vera Mikhailovna Kulikova, Ulyanovskaya ulitsa, 52a, kv. 4, all of Moscow, U.S.S.R.

Filed Dec. 20, 1974, Ser. No. 534,667

Int. Cl.² C07C 45/24, 49/73; C07J 9/00

U.S. Cl. 260—396 R 5 Claims

1. Method of recovering both ergosterol and ubiquinone-9, in a single process from a biomass of a yeast which produces both ergosterol and ubioquinone-9, which comprises extracting the biolipid fraction from the biomass of said yeast containing ergosterol and ubiquinone-9 by means of a solvent for said biolipid fraction, separation said biolipid fraction from said solvent, hydrolyzing said biolipid fraction with a solution of alkali in lower aliphatic alcohol in the presence of an antioxidant which prevents oxidation of ergosterol and ubiquinone-9, extracting the unsaponifiable components from the thus hydrolyzed mixture by means of an organic solvent therefor, evaporating the thus obtained extract to crystallize out ergosterol, separating the precipitated ergosterol crystals from the mother liquor, removing the remaining solvent from the mother liquor, thus obtaining an oily product, and subjecting said oily product to adsorption on a chromatographic column, eluting and recovering the ubiquinone-9 from the eluate.

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3,965,131

## PROCESS FOR THE PURIFICATION OF CRUDE CHENODEOXYCHOLIC ACID

Dietrich Wiele, and Jürgen Riemann, both of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin, Germany

Filed Jan. 23, 1975, Ser. No. 543,626

Claims priority, application Germany, Jan. 25, 1974, 2404102

Int. Cl.² C07J 9/00

U.S. Cl. 260—397.1 8 Claims

1. A process for the purification of crude chenodeoxycholic acid which comprises subjecting an aqueous solution of an alkali salt of crude chenodeoxycholic acid to exhaustive continuous liquid-liquid extraction with an immiscible organic solvent, separating the thuspurified aqueous solution and then acidifying the separated solution to precipitate the chenodeoxycholic acid therefrom.

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3,965,132

## ACID AND ESTER PRODUCTION

John R. Norell, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed June 3, 1974, Ser. No. 475,977

Int. Cl.² C07C 51/14, 67/38

U.S. Cl. 260—410.9 R 10 Claims

1. A process for the production of dimer acids and esters which comprises reacting

a. at least one olefin selected from linear olefins having from 4 to 12 carbon atoms and the cyclic olefin cyclohexene,

b. at least one polar compound selected from water and alcohols of the formula

wherein R is hydrogen, alkyl, or hydroxyalkyl with the further proviso that the two R groups together can represent an alkylene grouping selected from tetramethylene and pentamethylene and the total number of carbon atoms does not exceed 12, and

c. carbon monoxide,

in the presence of

d. trifluoromethanesulfonic acid, under reaction conditions including a temperature in the range of about −50°C to about 100°C and carbon monoxide pressure in the range of about 25 to about 5,000 psig to produce dimer acids and esters.

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**3,965,133**

**POLYMER**

**Alf-Coran Dahlberg, Nykvarn; Karl Gustav Hogberg, Sodertalje; Sven Lindvall, Sodertalje, and Thore Oskar Verner Rydh, Sodertalje, all of Sweden, assignors to Astra Lakemedel Aktiebolag, Sodertalje, Sweden**

**Division of Ser. No. 294,930, Oct. 4, 1972, Pat. No. 3,886,267. This application July 22, 1974, Ser. No. 490,850**

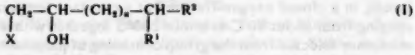
**Int. Cl.² C07F** *15/02*

**U.S. Cl. 260—439 R** **22 Claims**

1. An iron-containing composition of matter which comprises a complex of ferric iron and a physiologically innocuous, water swellable polymer which is the reaction product (per mole of component iii below) of

i. about 0.1 to 1.0 moles of at least one hydroxy carboxylic acid selected from the group consisting of arabonic acid, gluconic acid and glucoheptonic acid and salts and lactones derivable therefrom;

ii. about 0.05 to 5 moles of at least one polymerizing agent of the formula



(I)

wherein *n* is an integer selected from the group consisting of 0, 1, 2, 3, and 4; X is selected from the group consisting of Cl, Br, and I; $R^1$ is selected from the group consisting of OH, Cl, Br, and I; and $R^2$ is selected from the group consisting of H, and if $R^1$ is OH also the radical $-CH_2-X$, wherein X has the meaning specified above, and diepoxides derivable therefrom; and

iii. at least one polyhydric alcohol selected from the group consisting of glycerol, polyglycerols, tetritols, pentitols, hexitols, heptitols, partial alkyl ethers of said polyhydric alcohols wherein the alkyl group contains 1 to 5 carbon atoms, and partial hydroxyalkyl ethers of said polyhydric alcohols wherein the alkyl group contains 1 to 5 carbon atoms,

the polymer components having been reacted in aqueous solution at a temperature between about 20°C and the boiling point of the reaction mixture, and thereafter dried.

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**3,965,134**

**PROCESS FOR MAKING SILARYLENESILANEDIOL**

**Ronald W. LaRochelle, Schenectady, and Tyrone D. Mitchell, Troy, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Oct. 10, 1975, Ser. No. 621,527**

**Int. Cl.² C07F** *7/08*

**U.S. Cl. 260—448.2 E** **5 Claims**

1. In a method for making silarylenesilanediol comprising the steps of

1. refluxing a mixture consisting essentially of a dialkoxy silarylene, water and water miscible organic solvent and
2. stripping the mixture of volatiles under reduced pressure to a temperature of about 100°C to produce a product consistng essentially of silanol-terminated silarylene-siloxane, the improvement which comprises, combining the mixture of (1) with at least 2 parts of water per part of water miscible organic solvent used in the mixture, to effect the separation of silarylenesilanediol from the resulting mixture, whereby step (2) involving the stripping of the mixture of (1) is eliminated.

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**3,965,135**

**ALKOXYSILANOL CLUSTER COMPOUNDS AND THEIR PREPARATION**

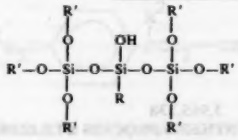
**Karl O. Knollmueller, Hamden, Conn., assignor to Olin Corporation, New Haven, Conn.**

**Filed Sept. 24, 1975, Ser. No. 616,439**

**Int. Cl.² C07F** *7/18, 7/04*

**U.S. Cl. 260—448.8 A** **15 Claims**

1. A compound of the formula:



(I)

wherein R is hydrogen, an alkyl, alkenyl, aryl or aralkyl, and each R′ is independently selected from the same group as R with the proviso that at least a majority of R′ radicals are sterically hindered alkyl groups having at least 3 carbon atoms.

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**3,965,136**

**ALKOXYSILANE CLUSTER COMPOUNDS AND THEIR PREPARATION**

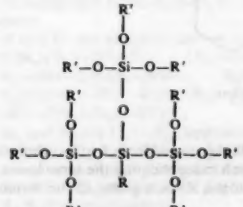
**Karl O. Knollmueller, Hamden, Conn., assignor to Olin Corporation, New Haven, Conn.**

**Filed Sept. 24, 1975, Ser. No. 616,438**

**Int. Cl.² C07F** *7/04, 7/18*

**U.S. Cl. 260—448.8 A** **23 Claims**

1. A compound of the formula:



(I)

wherein R is hydrogen, an alkyl, alkenyl, aryl or aralkyl, and each R′ is independently selected from the same group as R with the proviso that at least a majority of R′ radicals are sterically hindered alkyl groups having at least 3 carbon atoms.

## 3,965,137
## THIOCYANO XANTHATES

Llewellyn W. Fancher, Orinda, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Continuation-in-part of Ser. No. 466,106, May 2, 1974, abandoned. This application Mar. 31, 1975, Ser. No. 561,951
Int. Cl.² C07C *161/02, 155/06, 155/08*
U.S. Cl. 260—454 19 Claims

1. A compound having the formula

wherein X equals —O or —S; and R is selected from the group consisting of alkyl containing from 1 to 7 carbon atoms, alkoxyalkyl containing from 2 to 7 carbon atoms, napthyl, phenyl and substituted phenyl wherein the substituents can be selected from the group consisting of alkyl containing from 1 to 3 carbon atoms, alkoxy containing from 1 to 3 carbon atoms, halogen and nitro.

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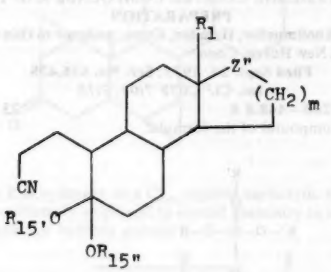
## 3,965,138
## STEROID TOTAL SYNTHESIS PROCESS UTILIZING A CYANOALKYL A-RING PRECURSOR

Noal Cohen, Montclair; Michael Rosenberger, Caldwell, and Gabriel Saucy, Essex Fells, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

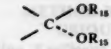
Division of Ser. No. 450,709, March 13, 1974, Pat. No. 3,925,420, which is a division of Ser. No. 67,296, Aug. 26, 1970, Pat. No. 3,813,417. This application July 28, 1975, Ser. No. 599,739
Int. Cl.² C07C *121/46*
U.S. Cl. 260—464 4 Claims

1. A compound of the formula




where $R_1$ is a primary alkyl group of from 1 to 5 carbon atoms; $R_{15}$ and $R_{15}$ are each independently the same lower alkyl having 1 to 8 carbon atoms; Z'' is a group of the formula

where $R_7$ is hydrogen, lower alkanoyl having 1 to 8 carbon atoms or lower alkyl having 1 to 8 carbon atoms and $R_9$ is hydrogen or lower alkyl having 1 to 8 carbon atoms or Z'' is a group of the formula




where $R_{15}$ and $R_{15}$ are the same lower alkyl as above; and *m* is 1 or 2.

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## 3,965,139
## 2-CHLORO-N-(CYANOMETHYL)ACETANILIDES

James A. Scozzie, Wickliffe, Ohio, assignor to Diamond Shamrock Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 316,409, Dec. 18, 1972, abandoned. This application May 1, 1974, Ser. No. 465,755
Int. Cl.² C07C *121/78*
U.S. Cl. 260—465 D 1 Claim

1. 2-Chloro-N-cyanomethyl-2',6'-dimethylacetanilide.

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## 3,965,140
## PROCESS FOR THE PREPARATION OF HYDROXYL-TERMINATED LIQUID POLYMERS

Yoshiaki Someya, Hiratsuka; Noriaki Tateno, Yokohama, and Kunio Kageyama, Yokohama, all of Japan, assignors to The Yokohama Rubber Co. Ltd., Tokyo, Japan

Filed May 16, 1974, Ser. No. 470,465
Claims priority, application Japan, July 28, 1973, 48-84592; July 28, 1973, 48-84593
Int. Cl.² C07C *121/00*; C07C *31/18, 29/02, 31/34*
U.S. Cl. 260—465.6 16 Claims

9. A process for the preparation of hydroxyl terminated liquid polymers, wherein said polymers have a number average molecular weight of from about 500 to about 10,000, and 2.0–2.7 terminal hydroxy groups per molecule located at the allyl position thereof and wherein said polymers are obtained by copolymerizing a conjugated diene monomer, wherein said diene monomer has 4–6 carbon atoms with conjugated double bonds, in a closed oxygen-free cell at a constant temperature ranging from about 80°C to about 200°C together with a vinyl monomer selected from the group consisting of parachlorostyrene, acrylonitrile and styrene, using an aqueous solution of hydrogen peroxide as a radical initiator in the presence of a metal halide selected from the group consisting of nickel, paladium, and platinum wherein said metal halide is present in the amount of a molar ratio to the monomer used of from $1.0 \times 10^{-5}$ to 1.0, wherein said polymers are obtained from a single phase reaction system with isopropanol as the reaction medium, and wherein the aforesaid conjugated diene monomer and the aforesaid vinyl monomer constitute the sole organic reactive components.

13. A process for the preparation of hydroxyl terminated liquid polymers, wherein said polymers have a number average molecular weight of from about 500 to about 10,000 and 2.0–2.7 terminal hydroxy groups per molecule located at the allyl positions thereof and wherein said polymers are obtained by copolymerizing a conjugated diene monomer, wherein said diene monomer has 4–6 carbon atoms with conjugated double bonds in a closed oxygen-free cell at a constant temperature ranging from about 80°C to about 200°C, together with a vinyl monomer selected from the group consisting of parachlorostyrene, acrylonitrile and styrene, using an aqueous solution of hydrogen peroxide as a radical initiator in the presence of a silver salt selected from the group consisting of silver nitrate, silver phosphate and silver halide wherein said silver compound is present in the amount of a molar ratio to the monomer used of from $1.0 \times 10^{-5}$ to 1.0, wherein said polymers are obtained from a single phase reaction system with isopropanol as the reaction medium and wherein the aforesaid diene monomer and the aforesaid vinyl monomer constitute the sole reactive organic components.

## 3,965,141
## PROCESS FOR PRODUCING DIALKYL AMINOACRYLONITRILE

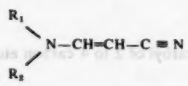
Willy Leimgruber, Montclair, and Manfred Weigele, North Caldwell, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 480,660, June 19, 1974, Pat. No. 3,900,511, which is a division of Ser. No. 338,018, March 5, 1973, Pat. No. 3,853,946, which is a division of Ser. No. 197,968, Nov. 11, 1971, Pat. No. 3,742,015, which is a division of Ser. No. 42,528, June 1, 1970, Pat. No. 3,655,716, which is a division of Ser. No. 719,834, April 9, 1968, Pat. No. 3,542,848. This application May 2, 1975, Ser. No. 574,163

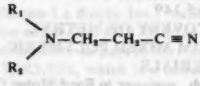
Int. Cl.² C07C *120/00*

U.S. Cl. 260—465.5 R 1 Claim

1. A process for producing a dialkylaminoacrylonitrile having the formula:



wherein $R_1$ and $R_2$ are lower alkyl containing from 1 to 6 carbon atoms;
comprising treating a compound of formula:



wherein $R_1$ and $R_2$ are as above; with a hydrogen acceptor at a temperature of from 50°C. to 200°C. in the presence of a dehydrogenation catalyst.

## 3,965,142
## PRODUCTION OF ALICYCLIC UNSATURATED COMPOUNDS HAVING PENDENT FUNCTIONAL GROUPS

Günther Wilke, and Paul Heimbach, both of Mulheim, Ruhr, Germany, assignors to Studiengesellschaft Kohle m.b.H., Mulheim, Ruhr, Germany

Continuation of Ser. No. 845,904, July 29, 1969, abandoned, which is a continuation-in-part of Ser. No. 582,775, Sept. 27, 1966, abandoned. This application May 5, 1972, Ser. No. 250,533

Claims priority, application Germany, Sept. 29, 1965, 2443912

Int. Cl.² C07C *69/74*

U.S. Cl. 260—468 R 1 Claim

1. A process for preparing cyclodecane carboxylic acid ethyl ester which comprises contacting butadiene and acrylic acid ethyl ester at a temperature of from about −10° to 200°C in the presence of a 0-valent nickel complex combined with tri-(ortho phenyl phenyl) phosphite as the sole electron donor, the mol ratio of butadiene to acrylic acid ethyl ester being at least 2:1, the reaction being carried out for a period of time sufficient to prepare 3,8-cyclodecadiene carboxylic acid ethyl ester, and thereafter hydrogenating said 3,8-cyclodecadiene carboxylic acid ethyl ester to cyclodecane carboxylic acid ethyl ester.

## 3,965,143
## 16-OXYGENATED PROSTANOIC ACID DERIVATIVES

Paul W. Collins, Deerfield, and Raphael Pappo, Skokie, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Filed Mar. 26, 1974, Ser. No. 454,913

Int. Cl.² C07C *61/38*, *69/74*

U.S. Cl. 260—468 D 3 Claims

1. The compound which is racemic methyl 7-[3(R)-hydroxy-2β-(4(RS)-4-hydroxy-4-methyl-trans-1-octenyl)-5-oxocyclopentane]-1α-heptanoate.

2. The compound which is racemic methyl 7-[3(S)-hydroxy-2β-(4(RS)-4-hydroxy-4-methyl-1-octynyl)-5-oxocyclopentane]-1α-heptanoate.

3. The compound which is racemic methyl 7-[3(R)-hydroxy-2β-(4(RS)-4-cyclohexylmethyl-4-hydroxy-4-methyl-trans-1-butenyl)-5-oxocyclopentane]-1α-heptanoate.

## 3,965,144
## CARBANILATE COMPOUND FOR ERYTHEMAL PROTECTION

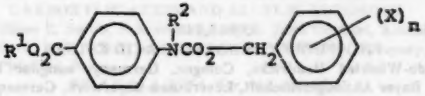
Martin E. Packard, Los Altos Hills; Edwin F. Ullman, Atherton, and Terry L. Burkoth, Palo Alto, all of Calif., assignors to Syva Company, Palo Alto, Calif.

Continuation-in-part of Ser. No. 388,004, Aug. 13, 1973, abandoned, which is a continuation of Ser. No. 71,783, Sept. 14, 1970, abandoned. This application Oct. 10, 1973, Ser. No. 405,237

Int. Cl.² C07C *125/06*

U.S. Cl. 260—471 C 8 Claims

1. A compound of the formula



wherein $R^1$ is hydrogen or saturated aliphatic of from 1 to 6 carbon atoms and 0 to 3 heteroatoms, which are oxygen, as hydroxyl or ether oxygen;
$R^2$ is hydrogen or saturated aliphatic of from 1 to 6 carbon atoms;
*n* is an integer of from 2 to 3; and
X is alkoxy of from 1 to 3 carbon atoms.

## 3,965,145
## COUPLED PEROXIDES

Antonio Joseph D'Angelo, Englishtown, N.J.; Orville Leonard Mageli, and Chester Stephen Sheppard, both of Kenmore, N.Y., assignors to Pennwalt Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 342,111, March 16, 1973, abandoned, which is a division of Ser. No. 737,359, June 17, 1968, Pat. No. 3,725,455. This application Jan. 16, 1974, Ser. No. 433,945

Int. Cl.² C07C *179/18*, *179/20*

U.S. Cl. 260—471 C 5 Claims

1. A compound of the formula R—C(=O)—$R^4$—C(=O)—R′ where:
a. R and R′ are identical and are selected from $R_3$—OO—$C(R_1)(R_2)$—$R^3$—O—, $(R_3$—OO—$)_2C(R_4)$—$R^3$O—, $R_3$—OO—C(=O)—$R^3$O—, $R_3$OO—C(=O)—O$R^3$O—, $R_1$OC(=O)—OO—$C(R_1)(R_2)$—$R^2$O— and $R_1$C(=O)—OO—$C(R_1)(R_2)$—$R^2$O—;
b. $R_1$ and $R_2$ are $C_1$ — $C_{18}$ hydrocarbon aliphatic;
c. $R_3$ is $C_4$—$C_{10}$ hydrocarbon aliphatic and the carbon atom joined to the peroxy oxygen atom is a tertiary carbon;
d. $R_4$ is $C_1$—$C_{10}$ hydrocarbon aliphatic;
e. $R_5$ is H or lower alkyl;
f. Y is —N($R_6$)—;
g. $R^2$ is $C_1$—$C_{10}$ hydrocarbon aliphatic;
h. $R^3$ is $C_1$—$C_{10}$ hydrocarbon aliphatic, $C_3$—$C_{12}$ hydrocarbon cycloaliphatic or $C_6$—$C_{12}$ hydrocarbon aromatic, with the proviso the $R^3$ is not aromatic when $R^4$ is $R^3$; and
i. $R^4$ is $R^3$, $YR^3Y$, $YR^3OC(=O)R^4C(=O)OR^3Y$, $YR^3OC(=O)R^3Y$ or $YR^3OR^3Y$.

## 3,965,146
## BIPHENYLYLOXY BENZOIC ACID AND ESTERS THEREOF

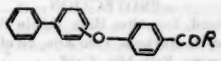
Klaus J. Dahl, Palo Alto, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Division of Ser. No. 366,326, June 4, 1973, Pat. No. 3,914,298, which is a division of Ser. No. 218,466, Feb. 16, 1971, abandoned, which is a continuation-in-part of Ser. No. 115,824, Feb. 16, 1971, abandoned. This application Apr. 11, 1975, Ser. No. 567,265

Int. Cl.² C07C 69/76

U.S. Cl. 260—473 R 6 Claims

1. A compound of structure



wherein, R is selected from the group consisting of hydroxyl, or $C_1$–$C_3$ alkoxy.

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## 3,965,147
## PHOSPHONOCARBOXYLIC ACID ESTERS

Udo-Winfried Hendricks, Cologne, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Germany

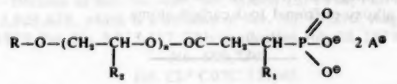
Filed May 6, 1974, Ser. No. 467,149

Claims priority, application Germany, May 5, 1973, 2322705

Int. Cl.² C07F 9/38

U.S. Cl. 260—478 6 Claims

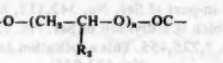
1. Phosphonocarboxylic acid esters of the formula



in which

R represents a $C_8$–$C_{22}$-alkyl radical, $C_8$–$C_{22}$-alkenyl radical or $C_8$–$C_{15}$-alkyl-phenyl radical,

$R_1$ represents hydrogen or the



group,

$R_2$ represents hydrogen or the methyl group, *n* represents a number from 1 to 10 and A represents hydrogen, an alkali metal ion or an ammonium ion.

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## 3,965,148
## PERFLUOROALKYL ALCOHOLS

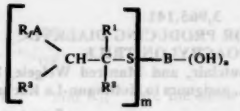
Eduard K. Kleiner, New York, and Robert A. Falk, New City, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 493,362, July 31, 1974, abandoned, which is a continuation of Ser. No. 281,084, Aug. 16, 1972, abandoned. This application May 5, 1975, Ser. No. 574,496

Int. Cl.² C07C 149/20

U.S. Cl. 260—481 R 6 Claims

1. An alcohol of the formula

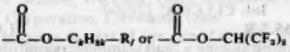


wherein

$R^1$, $R^2$ and $R^3$ are hydrogen, methyl, $R_fA$ or $R_fACH_2$ and at least one of $R^1$, $R^2$ and $R^3$ is $R_fA$ or $R_fACH_2$;

$R_f$ is a perfluoroalkyl group of 1 to 10 carbon atoms;

$R_fA$ is



*k* is 1 or 2;

*m* is 1 or 2;

*n* is 1 or 2;

and

B is saturated acyclic hydrocarbyl of 2 to 4 carbon atoms.

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## 3,965,149
## METHOD FOR RECOVERY OF METHYL METHACRYLATE FROM MIXED POLYMERIC MATERIALS

Lee R. Mahoney, Livonia, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 413,279, Nov. 5, 1973. This application Nov. 4, 1974, Ser. No. 520,760

Int. Cl.² C07C 69/54

U.S. Cl. 260—486 R 4 Claims

1. A method for recovering methyl methacrylate monomer from a particulate mixture of polymeric materials containing poly (methyl methacrylate) which comprises in combination:

1. subjecting said particulate mixture of polymeric materials to continuous extraction with a boiling $C_5$ – $C_8$ alkane for a time in excess of 1 minute.
2. separating the alkane from a resultant insoluble residue of said particulate mixture of polymeric materials,
3. subjecting said insoluble residue to continuous extraction with boiling acetone for a time in the range of about 0.5 to about 20 hous,
4. separating the acetone and resultant acetone extract from a resultant insoluble residue of said particulate mixture of polymeric materials,
5. volatilizing acetone from the acetone extract leaving a poly (methyl methacrylate)-comprising solid,
6. pyrolysis of said poly (methyl methacrylate)-comprising solid at a temperature in the range of about 250° C. to about 500°C., and
7. recovering methyl methacrylate monomer from said pyrolysis.

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## 3,965,150
## POLYETHER ESTERS OF ALKENOIC ACIDS

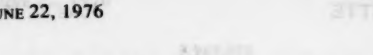
Richard E. Moeller, Troy, N.Y., assignor to General Electric Company, Waterford, N.Y.

Division of Ser. No. 99,717, Dec. 18, 1970. This application Jan. 13, 1975, Ser. No. 540,522

Int. Cl.³ C07C 69/52

U.S. Cl. 260—486 R 2 Claims

1. A compound having the structural formula



where R′ is a monovalent hydrocarbon radical of less than 8 carbon atoms, $R^3$ is a divalent radical selected from arylene and alkylene radicals of less than 20 carbon atoms, *c* is a whole number varying from 5 to 30 and *d* and *e* are whole numbers varying from 0 to 40.

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## 3,965,151

## INTERMEDIATES FOR TRICYCLIC BENZODIAZEPINES

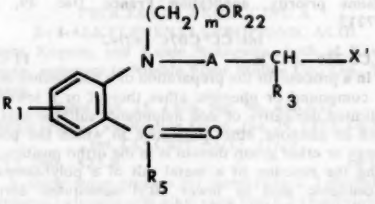
Michael Edward Derieg, Caldwell; James Valentine Earley, Cedar Grove; Rodney Ian Fryer, North Caldwell, and Leo Henryk Sternbach, Upper Montclair, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 45,928, June 12, 1970, abandoned, which is a continuation-in-part of Ser. No. 26,068, April 6, 1970, Pat. No. 3,905,956, which is a continuation-in-part of Ser. No. 863,377, Oct. 2, 1969, abandoned, which is a continuation-in-part of Ser. No. 768,909, Oct. 18, 1968, abandoned. This application Mar. 11, 1975, Ser. No. 557,438

Int. Cl.[2] C07C 97/10, 103/42

U.S. Cl. 260—490 4 Claims

1. A compound of the formula



wherein $R_1$ is hydrogen, nitro, trifluoromethyl, halogen, lower alkyl, lower alkyl mercapto or lower alkoxy; $R_3$ is hydrogen or lower alkyl; $R_5$ is phenyl or phenyl substituted with a member selected from the group consisting of halogen, nitro, trifluoromethyl and lower alkyl; $R_{22}$ is an acyl moiety derived from a lower alkanoic acid; m is an integer from 1-7; A is selected from the group consisting of $-CH_2-$ and

and X′ is chlorine, bromine or iodine.

## 3,965,152

## PROCESS FOR PREPARING ALLYLIC ESTERS OF CARBOXYLIC ACIDS

William E. Smith, Schenectady, and R. John Gerhart, Averill Park, both of N.Y., assignors to General Electric Company, Pittsfield, Mass.

Filed Feb. 4, 1974, Ser. No. 439,275

The portion of the term of this patent subsequent to June 22, 1993, has been disclaimed.

Int. Cl.[2] C07C 67/00

U.S. Cl. 260—491 4 Claims

1. A vapor process for preparing allylic esters of carboxylic acids which comprises reacting a mixture of lower alkyl carboxylate ester, water, and the corresponding carboxylic acid and alcohol with an olefin having an allylic carbon-hydrogen bond and oxygen in the presence of a catalyst consisting of a Group VIII noble metal, or its salts, or its oxides, or mixtures thereof and optionally a support and optionally a promoter selected from the group consisting of alkali metal carboxylates, alkaline earth metal carboxylates, the transition metals, their salts, gold or copper at a temperature of from about 100°C to about 200°C.

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## 3,965,153

## PROCESS FOR PREPARING ALLYLIC ESTERS OF CARBOXYLIC ACIDS AND ALLYLIC ALCOHOLS

William E. Smith, Schenectady, and R. John Gerhart, Averill Park, both of N.Y., assignors to General Electric Company, Pittsfield, Mass.

Filed Feb. 4, 1974, Ser. No. 439,276

The portion of the term of this patent subsequent to Apr. 9, 1991, has been disclaimed.

Int. Cl.[2] C07C 67/00

U.S. Cl. 260—491 10 Claims

1. A vapor phase process for preparing allylic esters of carboxylic acids and allylic alcohols which comprises reacting an olefin having an allylic carbon-hydrogen bond, a lower alkyl carboxylate ester, water and oxygen in the presence of a catalyst system comprising an oxidation catalyst selected from the group consisting of a Group VIII noble metal, or its salts, or its oxides, or mixtures thereof and an acidic co-catalyst which is an acidic support material at a temperature of from about 100°C to about 200°C.

8. A vapor phase process for preparing an allylic alcohol which comprises reacting an olefin having an allylic carbon-hydrogen bond, a lower alkyl carboxylate ester, water and oxygen in the presence of a catalyst system comprising an oxidation catalyst selected from the group consisting of a Group VIII noble metal, or its salts, or its oxides, or mixtures thereof and an acidic co-catalyst which is an acidic support material at a temperature of from about 160°C to about 200°C.

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## 3,965,154

## PROCESS FOR PREPARING ALLYLIC ESTERS OF CARBOXYLATE ACIDS AND ALLYLIC ALCOHOLS

William E. Smith, Schenectady, and R. John Gerhart, Averill Park, both of N.Y., assignors to General Electric Company, Pittsfield, Mass.

Filed Feb. 4, 1974, Ser. No. 439,277

The portion of the term of this patent subsequent to June 22, 1993, has been disclaimed.

Int. Cl.[2] C07C 67/00

U.S. Cl. 260—491 8 Claims

1. A vapor phase process for preparing allylic esters of carboxylic acids and allylic alcohols which comprises reacting a mixture of a lower alkyl carboxylate ester, water and the corresponding carboxylic acid and alcohol with an olefin having an allylic carbonhydrogen bond and oxygen in the presence of a catalyst system comprising an oxidation catalyst selected from the group consisting of a Group VIII noble metal or its salts or its oxides or mixtures thereof, and an

acidic co-catalyst which is an acidic support material at a temperature of from about 100°C to about 200°C.

6. A vapor phase process for preparing an allylic alcohol which comprises reacting a mixture of a lower alkyl carboxylate ester, water and the corresponding carboxylic acid and alcohol with an olefin having an allylic carbon-hydrogen bond and oxygen in the presence of a catalyst system comprising an oxidation catalyst selected from the group consisting of a Group VIII noble metal, or its salts, or its oxides or mixtures thereof and an acidic co-catalyst which is an acidic support material at a temperature of from about 160°C to about 200°C.

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## 3,965,155
## PROCESS FOR PREPARING VINYL ESTERS OF CARBOXYLIC ACIDS

**William E. Smith, Schenectady, and R. John Gerhart, Averill Park, both of N.Y., assignors to General Electric Company, Pittsfield, Mass.**

**Filed Feb. 4, 1974, Ser. No. 439,443**

**The portion of the term of this patent subsequent to June 22, 1993, has been disclaimed.**

**Int. Cl.² C07C *67/00***

**U.S. Cl. 260—491** **6 Claims**

1. A vapor phase process for preparing vinyl esters of carboxylic acids which comprises reacting ethylene, a lower alkyl carboxylate ester, water and oxygen in the presence of a catalyst system comprising an oxidation catalyst selected from the group consisting of a Group VIII noble metal or its salts, or its oxides or mixtures thereof and an acidic co-catalyst which is an acidic support material at a temperature of from about 100°C to about 200°C.

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## 3,965,156
## PROCESS FOR PREPARING VINYL ESTERS OF CARBOXYLIC ACIDS

**William E. Smith, Schenectady, and R. John Gerhart, Averill Park, both of N.Y., assignors to General Electric Company, Pittsfield, Mass.**

**Filed Feb. 4, 1974, Ser. No. 439,444**

**The portion of the term of this patent subsequent to June 22, 1993, has been disclaimed.**

**Int. Cl.² C07C *67/00***

**U.S. Cl. 260—491** **4 Claims**

1. A vapor phase process for preparing vinyl esters of carboxylic acids which comprises reacting a mixture of a lower alkyl carboxylate ester, water, and the corresponding carboxylic acid and alcohol with ethylene and oxygen in the presence of a catalyst consisting of Group VIII noble metal, or its salts, or its oxides, or mixtures thereof and optionally an acidic support material and optionally a promoter selected from the group consisting of alkali metal carboxylates, alkaline earth carboxylates, the transition metals, their salts, gold or copper at a temperature of from about 100°C to about 200°C.

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## 3,965,157
## PREPARATION OF α-ACETOXY ALDEHYDES AND KETONES

**Roger Garrick Harrison, Hampshire, England, assignor to Lilly Industries, Ltd., England**

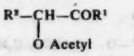
**Filed Dec. 16, 1974, Ser. No. 533,358**

**Claims priority, application United Kingdom, Dec. 17, 1973, 58352/73**

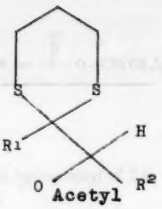
**Int. Cl.² C07C *67/28***

**U.S. Cl. 260—491** **8 Claims**

1. A process of preparing a compound of the formula




where $R^1$ and $R^2$ are independently hydrogen, $C_{1-4}$, alkyl, $C_{3-10}$ cycloalkyl, acetoxyalkyl wherein the alkyl group has 1–4 carbon atoms, phenyl, or phenyl substituted with one or more groups selected from halogen, methyl, trifluoromethyl, methoxy and nitro; which comprises hydrolyzing a compound of the formula:




in the presence of mercuric ion.

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## 3,965,158
## PROCESS FOR PREPARING HALOPHENOL SULFONIC COMPOUNDS AND HALOPHENOLS FROM HALOBENZENE SULFONATES

**Gerard Soula, Meyzieu; Jacques Metzger, and Louis Lena, both of Marseille, all of France, assignors to Rhone-Progil, Courbevoie, France**

**Filed Dec. 27, 1973, Ser. No. 428,828**

**Claims priority, application France, Dec. 29, 1972, 72.47213**

**Int. Cl.² C07C *143/42***

**U.S. Cl. 260—512 R** **11 Claims**

1. In a process for the preparation of a halophenol sulfonic acid compound or phenolic ether thereof or a lower alkyl substituted derivative of said halophenol sulfonic acid compound or phenolic ether derivative in which the phenolic hydroxy or ether group thereof is in the ortho position, comprising the reaction of a metal salt of a polyhalobenzene monosulfonic acid or lower alkyl substituted derivative thereof with a hydroxylating agent selected from the group consisting of alkali metal hydroxides and alkali metal lower alkoxides, the improvement comprising conducting said reaction in the presence of at least one ortho substitution orienting liquid organic compound having a dielectric constant not in excess of 25 determined at approximately 25°C. functioning as a reaction medium and selected from the group consisting of alkanols, cycloalkanols, oxoalcohols, benzylalcohols, amines, liquid poly ethers having a terminal hydroxy group thereon and mixtures thereof at a temperature between about 100°C. and 250°C., maintaining the molar ratio of said hydroxylating agent and said polyhalobenzene sulfonate salt between about 1/1 and 20/1, with the proviso that when said ortho substitution orienting liquid organic compound has a dielectric constant approximately equivalent to 25 at 25°C. the concentration of said hydroxylating agent is increased to compensate for the decreased selectivity of said ortho substitution orienting liquid organic compound, and recovering the halogenated phenolic compound.

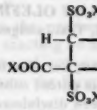
3,965,159

## CARBOXYDISULFOSUCCINATES

Ralph House, El Sobrante, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Jan. 2, 1975, Ser. No. 538,042
Int. Cl.² C07C 143/04, 143/12
U.S. Cl. 260—513 R 3 Claims

1. A compound useful as detergent builders having the formula:



in which X is H or an alkali metal, alkaline earth metal or ammonium cation.

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3,965,160

## REMOVAL OF IRON IMPURITIES FROM AROMATIC CARBOXYLIC ACIDS

Richard V. Norton, Wilmington, Del., assignor to Sun Ventures, Inc., Philadelphia, Pa.

Filed Apr. 3, 1974, Ser. No. 457,666
Int. Cl.² C07C 51/42
U.S. Cl. 260—515 P 7 Claims

1. A process for removing iron contamination of aromatic carboxylic acids of the benzene and naphthalene series obtained by aqueous hydrolysis of the corresponding nitriles which comprises oxidizing said aqueous nitrile hydrolysis products comprising ammonium salts of said aromatic carboxylic acids with air at a temperature between about 80° and about 250°C. to form insoluble iron compounds, separating said insoluble compounds and converting the acid ammonium salts to free acid.

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3,965,161

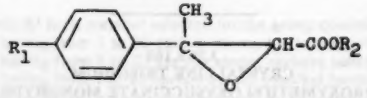
## PROCESS OF PRODUCING A 2-(4-ALKYLPHENYL)-PROPIONIC ACID

Katsura Kogure, and Kunio Nakagawa, both of Kawagoe, Japan, assignors to Nisshin Flour Milling Co., Ltd., Tokyo, Japan

Filed Jan. 25, 1974, Ser. No. 436,633
Claims priority, application Japan, Jan. 29, 1973, 48-11167
Int. Cl.² C07C 63/52, 51/24
U.S. Cl. 260—523 R 10 Claims

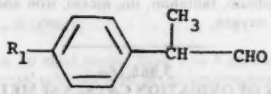
1. A single-stage process for converting a 3-methyl-3-(4-alkylphenyl)-glycidic acid alkyl ester into a 2-(4-alkylphenyl)-propionaldehyde and a 3-methyl-3-(4-alkylphenyl)-pyruvic acid, which comprises treating:

a. a 3-methyl-3-(4-alkylphenyl)-glycidic acid alkyl ester of the formula

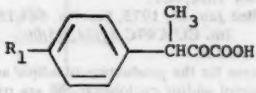


wherein $R_1$ is alkyl of 2–4 carbon atoms and $R_2$ is alkyl of 1–4 carbon atoms, with

b. an aqueous mineral acid at an elevated temperature for a period of time sufficient to form reaction products consisting essentially of a 2-(4-alkylphenyl)-propionaldehyde of the formula

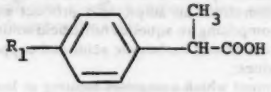


and a 3-methyl-3-(4-alkylphenyl)-pyruvic acid of the formula



wherein $R_1$ has the above-indicated values.

6. A process according to claim 1, further comprising oxidizing at least one of said reaction products to form a 2-(4-alkylphenyl)-propionic acid of the formula



wherein $R_1$ has the above-indicated values, or a pharmaceutically acceptable salt thereof.

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3,965,162

## PROCESS FOR PRODUCTION OF ACRYLIC ACID

Yoshihisa Watanabe; Makoto Imanari; Naohiro Nojiri; Nobuhiko Fuga, and Masato Nakajima, all of Ami, Japan, assignors to Mitsubishi Petrochemical Company Limited, Japan

Filed Oct. 23, 1973, Ser. No. 408,291
Claims priority, application Japan, Apr. 25, 1973, 48-46264
Int. Cl.² C07C 51/32
U.S. Cl. 260—530 N 7 Claims

1. A process for producing acrylic acid which comprises subjecting acrolein to catalytic vapor-phase oxidation with molecular oxygen over an oxidation catalyst consisting essentially of oxides of (1) molybdenum, (2) at least one member selected from the group consisting of copper, zinc, titanium, manganese, tungsten, iron, cobalt, nickel, cadmium, gallium, mercury, thorium and boron, (3) niobium, and (4) silicon at a temperature of from 200°C to 350°C and under a pressure of from 0.5 atmosphere to 10 atmospheres, gauge; in which the atomic ratio of the oxides of the metals of said catalyst is: element (1) 10, element (2) from 0.001 to 60, element (3) from 0.001 to 70, and element (4) from 2.5 to 500.

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3,965,163

## PROCESS FOR PREPARING UNSATURATED CARBOXYLIC ACIDS FROM THE CORRESPONDING UNSATURATED ALDEHYDES

Yoshio Oda; Keiichi Uchida, and Takeshi Morimoto, all of Yokohama, Japan, assignors to Asahi Glass Co., Ltd., Tokyo, Japan

Filed Mar. 15, 1974, Ser. No. 451,443
Claims priority, application Japan, Mar. 16, 1973, 48-29943; Mar. 16, 1973, 48-29944
Int. Cl.² C07C 51/26
U.S. Cl. 260—530 N 8 Claims

1. A process for preparing methacrylic acid, which comprises:

reacting methacrolein with molecular oxygen in the vapor phase at a temperature of from 250° to 450°C, in the presence of a catalyst consisting essentially of (a) molybdenum, (b) phosphorous, (c) antimony, (d) at least one element, but not more than any two elements selected from the group consisting of tungsten, barium, chromium,

lead, niobium, tantalum, tin, nickel, iron and zirconium, and (e) oxygen.

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3,965,164

## RECOVERY OF OXIDATION CATALYST METALS FROM ADIPIC ACID PRODUCTION

**Jorge A. Blay, Corpus Christi, Tex., assignor to Celanese Corporation, New York, N.Y.**

**Filed Jan. 27, 1975, Ser. No. 544,159**
**Int. Cl.² C07C *51/24, 55/00***
**U.S. Cl. 260—531 R** **6 Claims**

1. In a process for the production of adipic acid wherein

a. cyclohexanol and/or cyclohexanone are oxidized in the liquid phase by nitric acid oxidation at temperatures within the range of 55 to 100°C. utilizing a copper-vanadium catalyst to obtain a liquid reaction product comprising adipic acid and also produce a byproduct off-gas containing nitrogen oxides; and wherein

b. said reaction product is subjected to crystallization to isolate therefrom an adipic acid product and a mother liquor comprising an aqueous nitric acid solution containing therein dibasic carboxylic acids and copper and vanadium values;

the improvement which comprises treating at least a portion of said mother liquor to recover copper and vanadium values therefrom by:

c. concentrating said mother liquor to remove nitric acid and water therefrom and obtain a substantially dry residue containing said dibasic acids and said copper and vanadium values, the amount of nitric acid and water so removed being sufficient that the nitric acid content of said substantially dry residue is below about 5% by weight thereof and the water content of said substantially dry residue is below about 2.2% by weight thereof;

d. intimately mixing said substantially dry residue, water, and off-gas from said nitric acid oxidation to form an ultimate solution, the temperature of any aqueous solution derived from said off-gas being below 80°C. at all times, the amount of water utilized in forming said ultimate solution being at least four times the weight of said substantially dry residue and being sufficient to reduce the dibasic carboxylic acid content of the said ultimate solution to below about 17% by weight, the amount of off-gas utilized being such that the nitrous acid in the said ultimate solution derived from the off-gas, without regard to any nitrous acid present from said substantially dry residue, is at least 1% by weight of the said ultimate solution, but less than the amount of off-gas which would cause the combined total of nitric and nitrous acids in the said ultimate solution, including any nitrous and nitric acid derived from said substantially dry residue, to be greater than 3% by weight of said ultimate solution; and

e. recovering copper and vanadium values from the said ultimate solution by passing it through a bed of cation exchange resin in the hydrogen form so as to accumulate copper and vanadium ions thereon.

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3,965,165

## PROCESS FOR PREPARING SODIUM TETROLATE

**Takeshi Ichii, and Hiroshi Fujita, both of Hiro, Japan, assignors to Sankyo Company Limited, Tokyo, Japan**

**Continuation of Ser. No. 376,934, July 6, 1973, abandoned, which is a continuation of Ser. No. 145,045, May 19, 1971, abandoned, which is a continuation of Ser. No. 803,122, Feb. 27, 1969, abandoned. This application Dec. 2, 1974, Ser. No. 528,884**
**Claims priority, application Japan, Mar. 4, 1968, 43-15214**
**Int. Cl.² C07C *51/15***
**U.S. Cl. 260—533 B** **4 Claims**

1. In a process of preparing sodium tetrolate from methylacetylene, metallic sodium and carbon dioxide, the improvement which comprises introducing gaseous methylacetylene having a high content of butadiene into a mixture of tertiary amine, metallic sodium and a hydrocarbon solvent at a temperature ranging from 50° to 70°C, said tertiary amine being employed in an amount corresponding to about 1 to 2 moles per mole of said metallic sodium, and thereafter bubbling carbon dioxide into the reaction mixture at a temperature ranging from 0° to 20°C.

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3,965,166

## OXIDATION OF OLEFINS

**León B. Levy, Corpus Christi, Tex., assignor to Celanese Corporation, New York, N.Y.**

**Filed Feb. 24, 1969, Ser. No. 801,766**
**The portion of the term of this patent subsequent to June 22, 1993, has been disclaimed.**
**Int. Cl.² C07C *51/32***
**U.S. Cl. 260—533 N** **9 Claims**

1. A process by which an alpha olefin having from 3 to 5 carbon atoms may be oxidized to the corresponding ethylenically unsaturated aldehyde or mixtures thereof with the corresponding ethylenically unsaturated carboxylic acid, said process comprising reacting in the gas phase said olefin with oxygen in the presence of a catalyst consisting essentially of the empirical formula:

$$Mo_xCr_yTe_zO_n$$

wherein $x$, $y$, $z$ and $n$ are numbers such that the atomic ratio of Mo:Cr:Te:O is 100:10–50:0.1–10:300–500; at a temperature sufficient to produce the desired product.

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3,965,167

## CRYSTALLINE AMMONIUM N-ACETYL-L-CYSTEINATE AND MUCOLYTIC PROCESS

**Eugene Emanuel Hamlow, and Tellis Alexander Martin, both of Evansville, Ind., assignors to Mead Johnson & Company, Evansville, Ind.**

**Filed Feb. 3, 1972, Ser. No. 223,352**
**Int. Cl.² C07C *101/04***
**U.S. Cl. 260—534 S** **1 Claim**

1. Crystalline ammonium salt of N-acetyl-L-cysteine.

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3,965,168

## 3-CARBAMOYL-3-HYDROXYGLUTARIC ACID AND SALTS

**Karl E. Wiegand, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.**

**Division of Ser. No. 347,822, April 4, 1973, Pat. No. 3,911,002, which is a division of Ser. No. 172,627, Aug. 18, 1971, Pat. No. 3,769,337. This application Jan. 20, 1975, Ser. No. 542,371**
**Int. Cl.² C07C *101/20***
**U.S. Cl. 260—534 M** **5 Claims**

1. 3-carbamoyl-3-hydroxyglutaric acid and the alkali metal, alkaline earth metal and ammonium salts thereof.

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3,965,169

## CRYSTALLINE TRISODIUM CARBOXYMETHYLOXYSUCCINATE MONOHYDRATE

**N. Earl Stahlheber, Columbia, Ill., assignor to Monsanto Company, St. Louis, Mo.**

**Filed Feb. 25, 1974, Ser. No. 445,693**
**Int. Cl.² C07C *59/22***
**U.S. Cl. 260—535 P** **1 Claim**

1. Crystalline trisodium carboxymethyloxysuccinate monohydrate.

## 3,965,170
## PROCESS FOR THE PRODUCTION OF ETHER POLYCARBOXYLIC ACIDS

**Horst-Jürgen Krause, Dusseldorf-Holthausen, Germany, assignor to Henkel & Cie G.m.b.H., Dusseldorf-Holthausen, Germany**

**Filed Sept. 25, 1975, Ser. No. 616,764**

**Claims priority, application Germany, Sept. 30, 1974, 2446687**

**Int. Cl.² C07C** *59/22*

**U.S. Cl. 260—535 P** **9 Claims**

1. A process for the production of ether polycarboxylic acids consisting of reacting an alkali metal salt selected from the group consisting of sodium and potassium of an ether carboxylic acid having the formula

$$R^1 - O - CHR^2 - COOH$$

wherein $R^1$ is a member selected from the group consisting of alkyl having from 1 to 22 carbon atoms, hydroxy substituted alkyl having from 1 to 22 carbon atoms, carboxy substituted alkyl having from 1 to 22 carbon atoms, oxaalkyl having 3 to 22 carbon atoms, polyoxaalkyl having 5 to 32 carbon atoms and 2 to 6 hetero oxygens, and carboxy substituted oxaalkyl having 3 to 22 carbon atoms and $R^2$ is a member selected from the group consisting of hydrogen and alkyl having from 1 to 4 carbon atoms with an excess of carbon dioxide in the presence of (1) at least an equimolar amount of an alkali metal alkoxy-silano-carbonate having the formula

$$(R^3O)_{4-n}\,Si\,(O-\overset{O}{\overset{\|}{C}}-OMe)_n$$

wherein $R^3$ is an alkyl having from 1 to 4 carbon atoms, Me is an alkyl metal selected from the group consisting of sodium and potassium, and $n$ is an integer from 1 to 3 and (2) from 0 to 30% by weight, based on the weight of the reaction mixture of a diluent selected from the group consisting of a finely-divided inert diluent, and an inert liquid diluent, at a temperature of between 200° and 350°C under a pressure of at least 2 atmospheres gauge, for a time sufficient to effect carboxylation, and recovering said ether polycarboxylic acids.

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## 3,965,171
## PROCESS FOR THE PRODUCTION OF ETHER POLYCARBOXYLIC ACIDS

**Horst-Jurgen Krause, Dusseldorf-Holthausen, Germany, assignor to Henkel & Cie G.m.b.H., Dusseldorf-Holthausen, Germany**

**Filed Sept. 25, 1975, Ser. No. 616,763**

**Claims priority, application Germany, Sept. 30, 1974, 2446686**

**Int. Cl.² C07C** *59/22*

**U.S. Cl. 260—535 P** **9 Claims**

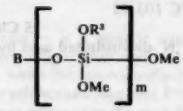
1. A process for the production of ether polycarboxylic acids consisting of reacting an alkali metal salt selected from the group consisting of sodium and potassium of an ether carboxylic acid having the formula

$$R^1 - O - CHR^2 - COOH$$

wherein $R^1$ is an member selected for the group consisting of alkyl having from 1 to 22 carbon atoms, hydroxy substituted alkyl having from 1 to 22 carbon atoms, carboxy substituted alkyl having from 1 to 22 carbon atoms, oxaalkyl having 3 to 22 carbon atoms, polyoxaalkyl having 5 to 32 carbon atoms and 2 to 6 hetero oxygens, and carboxy substituted oxaalkyl having 3 to 22 carbon atoms and $R^2$ is a member selected from the group consisting of hydrogen and alkyl having from 1 to 4 carbon atoms with an excess of carbon dioxide in the presence of (1) at least an equimolar amount of a silicon compound selected form the group consisting of (a) an alkali metal alkoxy-silanolate having the formula

$$(R^3O)_{4-n}\,Si\,(OMe)_n$$

wherein $R^3$ is an alkyl having from 1 to 4 carbon atoms, Me is an alkali metal selected from the group consisting of sodium and potassium, and $n$ is an integer from 1 to 3 and (b) an alkali metal alkoxy siloxanolate having the formula



where Me and $R^3$ have the above assigned-values, B is selected from the group consisting of $R^3$ and Me and $m$ is an integer from 2 to 50, and (2) from o to 30% by weight, based on the weight of the reaction mixture of a finely-divided inert diluent, and an inert liquid diluent, at a temperature of between 200° and 350°C under a pressure of at least 2 atmospheres gauge, for a time sufficient to effect carboxylation, and recovering said ether polycarboxylic acids.

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## 3,965,172
## PRODUCTION OF N,N-DICHLORO-TEREPHTHALAMIDE AND N,N-DICHLORO-ISOPHTHALAMIDE

**Hans-Georg Zengel, Kleinwallstadt, and Manfred Bergfeld, Erlenbach, both of Germany, assignors to Akzona Incorporated, Asheville, N.C.**

**Filed Mar. 13, 1974, Ser. No. 450,674**

**Claims priority, application Germany, Mar. 19, 1973, 2313548**

**Int. Cl.² C07C** *119/18, 135/00*

**U.S. Cl. 260—543 A** **9 Claims**

1. A process for the production of N,N'-dichloro-terephthalamide or N,N'-dichloro-isophthalamide from the corresponding terephthalamide or isophthalamide as the initial phthalamide reactant, which process comprises:

reacting chlorine at a temperature of about 0°C. to 100°C. with said phthalamide reactant suspended in a liquid reaction mixture which, over the course of the reaction, consists essentially of a dilute aqueous solution of a mineral acid, the dilution being such that all of the hydrogen chloride formed by the chlorination reaction remains substantially completely dissolved in the reaction mixture.

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## 3,965,173
## PROCESS FOR PREPARING p-(5-CHLORO-2-METHOXY-BENZAMIDOETHYL)-BENZENE SULFONAMIDE

**Francis L. Chubb, 4835 Pierre Lauzon, Pierre Fondes 910, and Lucien Eric, 1141 Lucerne Road, Town of Mount Royal, Montreal 305, both of Canada**

**Filed May 21, 1971, Ser. No. 145,923**

**Int. Cl.² C07C** *143/80*

**U.S. Cl. 260—556 AR** **5 Claims**

1. A process for preparing p-(2-{5-chloro-2-methoxybenzamido}ethyl)-benzene sulfonamide which comprises the steps of methylating 5-chlorosalicylic acid to methyl-5-chloro-2-methoxybenzoate, treating methyl-5-chloro-2-methoxybenzoate with phenethylamine to obtain N-phenethyl-5-chloro-2-methoxybenzamide, subjecting said N-phenethyl-5-chloro-2-methoxybenzamide to chlorosulfonation and aminolysis to yield p-(2-{5-chloro-2-methoxybenzamido}ethyl)-benzene sulfonamide.

## 3,965,174
## PROCESS FOR PREPARING N,N-DISUBSTITUTED ACID HYDRAZIDES

Russell E. Malz, Jr., Naugatuck; Roger W. Amidon, Oxford, and Harold Greenfield, Watertown, all of Conn., assignors to Uniroyal, Inc., New York, N.Y.

Filed July 16, 1975, Ser. No. 596,544
Int. Cl.² C07C *103/32*
U.S. Cl. 260—561 H 15 Claims

1. A process for preparing N′,N′-disubstituted acid hydrazides of the formula

$$R(CONR^1NR^2R^3)_n$$

comprising reacting an N′-monosubstituted acid hydrazide of the formula

$$R(CONR^1NHR^2)_n$$

with an aldehyde of the formula $R^4CHO$ in the presence of hydrogen and a hydrogenation catalyst wherein *n* is an integer of 1 or 2;

R is hydrogen, a monovalent hydrocarbyl group, a divalent hydrocarbyl group, or a single bond;

$R^1$ is hydrogen or a hydrocarbyl group;

$R^2$ is a hydrocarbyl group;

$R^3$ is a primary linear or branched alkyl group having 1 to 18 carbon atoms or benzyl; and

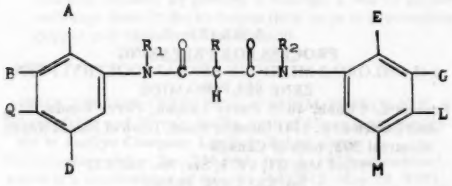
$R^4$ is hydrogen, a linear or branched primary, secondary or tertiary alkyl group having 1 to 17 carbon atoms or phenyl.

## 3,965,175
## POULTRY COCCIDIOSIS TREATING COMPOSITIONS AND METHOD OF USING THE SAME

Elijah H. Gold, West Orange, N.J., assignor to Schering Corporation, Kenilworth, N.J.

Filed Feb. 12, 1975, Ser. No. 549,263
Int. Cl.² C07C *103/14*, *103/34*
U.S. Cl. 260—562 R 16 Claims

1. A compound of the formula:



wherein A, B, Q, D, E, G, L and M are each selected from the group consisting of hydrogen, $NO_2$, $CF_3$, Cl and Br with the proviso that 3 to 5 of these are hydrogen and that A and E cannot be $NO_2$;

$R_1$ and $R_2$ are each selected from the group consisting of H and $C_1$–$C_4$ alkyl; and

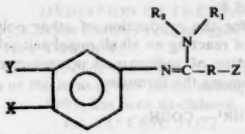
R is selected from the group consisting of $C_1$–$C_6$ alkyl and cyclopentenyl.

## 3,965,176
## NOVEL SUBSTITUTED AMIDINES

Elijah H. Gold, West Orange, N.J., assignor to Schering Corporation, Kenilworth, N.J.

Continuation-in-part of Ser. No. 371,790, June 20, 1973, abandoned. This application Dec. 13, 1974, Ser. No. 532,437
Int. Cl.² C07C *123/00*
U.S. Cl. 260—564 RF 12 Claims

1. Compounds of the general formula

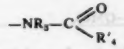


wherein $R_1$ represents hydrogen, lower alkyl, lower cycloalkyl, hydroxy, lower alkoxy, lower cycloalkoxy, unsubstituted phenyl or phenyl substituted by nitro, trifluoromethyl or halogen,

$R_2$ represents hydrogen, lower alkyl or lower cycloalkyl,

X is a member of the group consisting of nitro, trifluoromethyl, chloro, bromo and iodo,

Y is a member of the group consisting of hydrogen, halogen, nitro, amino, lower alkylamino, lower dialkylamino, lower alkyl, lower alkoxy, lower alkanoyl, polyfluorolower alkoxy, polyfluorolower alkyl, polyfluorolower alkylthio,



and $—NR_3SO_2R_4$ with $R_3$ being hydrogen or lower alkyl, $R_4$ being lower alkyl, and $R'_4$ is lower alkoxy and lower alkyl.

R is a divalent radical derived from an alkane or alkene having up to eight carbon atoms, either of which contains at least one secondary or tertiary carbon atom with the proviso that any double bond in said divalent radical derived from an alkene is not conjugated with the amidine double bond;

Z is a member of the group consisting of hydroxy, lower alkoxy,

and the pharmaceutically acceptable acid addition salts thereof.

## 3,965,177
## CATALYTIC PROCESS

Lawrence F. Kuntschik, and Robert S. Edwards, both of Nederland, Tex., assignors to Texaco Inc., New York, N.Y.

Continuation-in-part of Ser. No. 250,020, May 3, 1972, abandoned, which is a continuation-in-part of Ser. Nos. 202,022, Nov. 24, 1971, Pat. No. 3,799,984, and Ser. No. 737,866, June 18, 1968, Pat. No. 3,683,024. This application Apr. 15, 1974, Ser. No. 461,058
Int. Cl.² C07C *131/00*
U.S. Cl. 260—566 A 17 Claims

1. A process for preparing O-polyalkoxylated high molecular weight alkanone or alkanal oximes which comprises contacting a paraffin oxime corresponding to the formula:

where R and R′ are hydrogen or alkyl groups having from 1 to 11 carbon atoms and where the sum of R and R′ is 9 to 12 carbon atoms with a basic nitrogen catalyst selected from the group consisting of triethylamine, pyridine, methylpiperidine, N,N-dimethylethylamine, N,N-diethylmethylamine, N,N-dimethylpropylamine, N,N-diethylpropylamine and N,N-ethylmethylpropylamine and from 2 to 40 moles of an oxirane per mole of said oxime in the substantial absence of water and where said O-polyalkoxylated oxime is subsequently contacted with a mild oxidizing agent.

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**3,965,178**

## METHOD FOR PREPARING TETRABUTYLAMMONIUM BROMIDE

**Morris A. Johnson; James D. Reedy, and Kang Yang, all of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.**

**Continuation-in-part of Ser. Nos. 65,357, Aug. 19, 1973, abandoned, and Ser. No. 401,333, Sept. 27, 1973, abandoned. This application Feb. 12, 1975, Ser. No. 549,218**

**Int. Cl.² C07C *87/30***

**U.S. Cl. 260—567.6 M** **5 Claims**

1. A process for preparing tetrabutylammonium bromide in yields of at least 75 percent based on the amount of tributylamine present, said process comprising mixing as a solution n-butylbromide, tributylamine, and acetonitrile in an inert atmosphere provided by a gas selected from argon, nitrogen, helium, and ethylene to form a reaction mixture wherein said n-butylbromide is present in an amount equal to from about 1.0 to about 1.2 moles per mole of said tributylamine and wherein said acetonitrile is present in an amount equal to from about 100 to about 500 milliliters per mole of said tributylamine, heating said reaction mixture at its reflux temperature for a period of time from about 12 to about 24 hours to form a solution containing tetrabutylammonium bromide; cooling said solution; mixing said solution with water to form a mixture; and recovering said tetrabutylammonium bromide from said mixture.

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**3,965,179**

## ALPHA-ETHYNYL BENZOHYDROLS

**Edit Toth; Jozsef Törley; Sandor Gorog; Laszlo Szporny; Eva Palosi, and Szabolcz Szeberenyi, all of Budapest, Hungary, assignors to Richter Gedeon Vegyeszeti Gyar Rt., Budapest, Hungary**

**Filed Aug. 8, 1974, Ser. No. 495,846**

**Claims priority, application Hungary, Aug. 15, 1973, RI 520**

**Int. Cl.² C07C *33/04***

**U.S. Cl. 260—570 R** **2 Claims**

1. 4-(β-Dimethylamino-ethoxy)-α-ethynyl-benzhydrol.

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**3,965,180**

## 4′-FLUORO-4- [4-(PHENYL)-4-ALKOXY-CYCLO-HEXYL]AMINO BUTYROPHENONES AND THE SALTS THEREOF

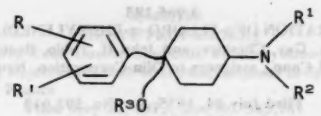
**Daniel Lednicer, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Continuation-in-part of Ser. No. 194,530, Nov. 1, 1971, abandoned. This application Feb. 20, 1973, Ser. No. 333,896**

**Int. Cl.² C07C *98/065***

**U.S. Cl. 260—570.5 CA** **13 Claims**

1. A compound of the formula



wherein ~ is a generic expression denoting cis and trans stereoconfiguration and mixtures thereof, with the proviso that when the stereoconfiguration of the linkage connecting the cyclohexane ring and $R^3O$ is cis to the amino group, the linkage connecting the cyclohexane and phenyl rings is always trans, and vice versa; R is selected from the group consisting of lower alkyl of 1 through 4 carbon atoms, chlorine, fluorine, bromine, trifluoromethyl, and lower alkoxy of 1 through 4 carbon atoms; R′ has the same meaning as R and in addition hydrogen; $R^1$ is selected from the group consisting of hydrogen and lower alkyl of 1 through 4 carbon atoms; $R^2$ is ring monosubstituted aroylalkyl wherein the substituents have the same meaning as R and R′, above, aryl is from 6 through 10 carbon atoms and alkyl of from 1 through 4 carbon atoms; and acid addition salts thereof.

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**3,965,181**

## TRICYCLIC PHARMACOLOGICAL AGENTS, INTERMEDIATES AND METHODS OF MAKING

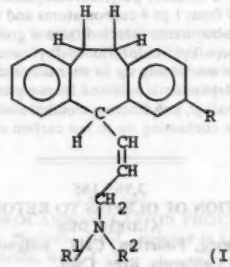
**Michael Marx, Sunnyvale, Calif., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.**

**Continuation of Ser. No. 377,107, July 6, 1973, abandoned. This application May 1, 1975, Ser. No. 573,495**

**Int. Cl.² C07C *87/29***

**U.S. Cl. 260—570.8 TC** **7 Claims**

1. A compound selected from the group having the formula:



(III cis)

wherein R is hydrogen, chloro, cyano, or trifluoromethyl; one of $R^1$ or $R^2$ is methyl and the other is selected from the group consisting of hydrogen, methyl, and p-chlorophenacyl;

and pharmaceutically acceptable salts thereof.

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**3,965,182**

## PREPARATION OF ANILINE FROM PHENOL AND AMMONIA

**Calvin J. Worrel, Detroit, Mich., assignor to Ethyl Corporation, Richmond, Va.**

**Filed Oct. 2, 1969, Ser. No. 863,349**

**Int. Cl.² C07C *87/52*, *87/56*, *87/62*, *87/64***

**U.S. Cl. 260—578** **7 Claims**

1. A process for making aromatic amines, said process comprising reacting a phenol with aluminum nitride and ammonia in a temperature range of from about 200°–600°C.

3,965,183

## PREPARATION OF p-FLUORO-m-PHENYLENEDIAMINE

Walter A. Gay, Cheshire, and John H. Tobin, Beacon Falls, both of Conn., assignors to Olin Corporation, New Haven, Conn.

Filed July 14, 1975, Ser. No. 595,613
Int. Cl.² C07C *85/11*, *85/12*
U.S. Cl. 260—578 4 Claims

1. A process for preparing p-fluoro-m-phenylene diamine comprising:

reacting m-nitroacetanilide with anhydrous hydrogen fluoride in the presence a deoxygenating agent selected from the group consisting of elemental phosphorus, elemental sulfur, phosphorus trihalides, sulfur halides in which sulfur has a valence lower than 6, aryl phosphorus halides, aryl sulfenyl halides and triarylphosphines at a temperature in the range of 0°–230°C at a pressure in the range of 15 to about 1,500 psia.

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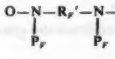
3,965,184

## NOVEL MATERIALS CONTAINING NITROGEN

Ronald Eric Banks, Hazel Grove, and Robert Neville Haszeldine, Disley, both of England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Jan. 30, 1973, Ser. No. 327,839
Claims priority, application United Kingdom, Jan. 31, 1972, 4382/72
Int. Cl.² C07C *135/02*
U.S. Cl. 260—583 D 11 Claims

1. A composition of matter having the general formula



wherein $R'_F$ is a divalent polyfluoroalkylene group having a chain length of from 1 to 4 carbon atoms and which may have one or more substituents selected from a group consisting of chloropolyfluoroalkyl, chlorofluoroalkyl and polyfluorocycloalkyl groups containing up to six carbon atoms;

and $P_F$ is independently selected from a group consisting of polyfluoroalkyl, polyfluorocycloalkyl and chlorofluoroalkyl groups containing up to ten carbon atoms.

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3,965,185

## OXIDATION OF OLEFINS TO KETONES AND ALDEHYDES

Donald C. Young, Fullerton, Calif., assignor to Union Oil Company of California, Brea, Calif.

Division of Ser. No. 268,487, July 3, 1972, Pat. No. 3,850,990, which is a continuation-in-part of Ser. No. 775,150, Nov. 12, 1968, abandoned. This application Apr. 11, 1974, Ser. No. 459,890
Int. Cl.² C07C *45/04*, *27/12*
U.S. Cl. 260—586 P 7 Claims

1. The method of oxidizing a hydrocarbon olefin having 2 to about 20 carbons to a carbonyl product thereof having the same number of carbon atoms as said olefin and selected from ketones and aldehydes which comprises contacting said olefin and molecular oxygen in a liquid reaction medium selected from the group consisting of aqueous media, $C_1$ to $C_3$ alkanoic acid media and combinations thereof. having dissolved therein a catalytic amount of a Group VIII noble metal containing catalyst and about 0.1 to about 5.0 moles of ammonium nitrate per mole of said olefin under reaction conditions including a pH of about 2 to about 6, a temperature of 25° to about 300°C. and a pressure of about 1 to about 1000 atmospheres sufficiet to convert said olefin to said carbonyl product in an amount greater than 100 moles of said carbonyl product per mole of said Group VIII metal and consume about 0.05 to about 0.9 moles of said ammonium nitrate per mole of said olefin converted.

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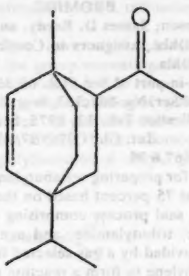
3,965,186

## 5- OR 6-ACETYL-SUBSTITUTED 1-METHYL-4-ISOPROPYL-1,4-ETHANO-CYCLOHEX-2-ENES

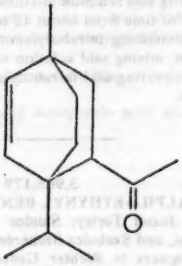
John B. Hall, Rumson, N.J., assignor to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 462,750, April 22, 1974, Pat. No. 3,929,895. This application June 26, 1975, Ser. No. 590,470
Int. Cl.² C07C *49/61*
U.S. Cl. 260—586 G 1 Claim

1. A mixture of chemical compounds having the structures:



and



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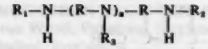
3,965,187

## HYDROGENATION OF PHENOL

Edwin D. Little, Convent Station, and Zafarullah K. Cheema, Morris Township, N.J., assignors to Allied Chemical Corporation, New York, N.Y.

Filed July 2, 1970, Ser. No. 52,129
Int. Cl.² C07C *45/00*
U.S. Cl. 260—586 R 5 Claims

1. In the process for hydrogenating phenol in the presence of hydrogenation catalyst in liquid or vapor phase at temperature of 24° to 400°C., using as starting material phenol having a purity of at least 99.8 percent obtained from fractional distillation of the cumene hydroperoxide decomposition product containing acetol as an impurity, the improvement which comprises: treating said phenol by contact with a polyamine of the formula:



wherein $n$ is an integer from 0 to 4; $R_1$, $R_2$ and $R_3$ are independently selected from the group consisting of hydrogen, alkyl, aryl, cycloalkyl, aralkyl and alkaryl and R independently at each occurrence is selected from the group of radicals consisting of alkylene, arylene, alkylenearylene, dialkylene, cycloaklyene, dialkylene cycloalkylene, nitrogen containing heterocyclic groups of 5 to 6 carbon atoms, and the lower alkyl substituted, hydroxy substituted and carboxyl substituted derivatives of said radicals

to reduce its acetol content to a level of less than 75 ppm prior to hydrogenation.

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**3,965,188**

**HOP EXTRACT PROCESS AND PRODUCT**

**Donald H. Westermann, Brookfield; Etzer Chicoye, and Darrell R. Hoffmann, both of Milwaukee, all of Wis., assignors to Miller Brewing Company, Milwaukee, Wis.**

**Division of Ser. No. 216,424, Jan. 10, 1972, Pat. No. 3,798,332. This application Jan. 3, 1974, Ser. No. 430,563 The portion of the term of this patent subsequent to Mar. 19, 1991, has been disclaimed.**

**Int. Cl.² C07C *45/24***

**U.S. Cl. 260—586 D** **7 Claims**

1. The method of concentrating an aqueous solution of potassium isohumulate comprising (*a*) acidifying the solution to a pH below about 3.6 to provide an aqueous phase and an isohumulone phase; (*b*) heating the liquid mixture under reduced pressure to evaporate the liquid until the concentration is increased to at least 30% wt/wt isohumulone; and (*c*) treating the resulting liquid mixture with KOH sufficient to redissolve the isohumulone as potassium isohumulate.

3. The method according to claim 1 in which the aqueous solution of potassium isohumulate which is concentrated is obtained by the following steps: treating a hop extract in a water-immiscible hop solvent with aqueous KOH in a liquid-liquid extraction operation at a pH of 5.5–8.1 in the case of reduced isohumulone and 5.2–7 in the case of unreduced isohumulone; the aqueous KOH:hop solvent volume ratio being 0.1–3.0; and recovering an aqueous potassium isohumulate solution containing at least 10% of the original isohumulone as potassium isohumulate at least 80% pure.

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**3,965,189**

**1-ACETYL-11-METHYLENE-4,7,7-TRIMETHYL-CYCLOUNDECA-4,8-DIENE**

**Karl-Heinrich Schulte-Elte, Onex-Geneva; Michel Joyeux, Carouge-Geneva, and Gunther Ohloff, Bernex-Geneva, all of Switzerland, assignors to Firmenich S.A., Geneva, Switzerland**

**Division of Ser. No. 499,120, Aug. 21, 1974. This application Oct. 20, 1975, Ser. No. 624,280**

**Claims priority, application Switzerland, Sept. 3, 1973, 12784/73**

**Int. Cl.² C07C *49/61***

**U.S. Cl. 260—586 M** **1 Claim**

1. 1-Acetyl-11-methylene-4,7,7-trimethyl-cycloundeca-4,8-diene.

**3,965,190**

**PHENYL PROPANONES**

**Don Pierre Rene Lucien Giudicelli, Fontenay-sous-Bois, and Henry Najer, Paris, both of France, assignors to Synthelabo, Paris, France**

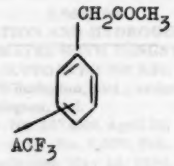
**Filed May 30, 1973, Ser. No. 365,181**

**Claims priority, application France, May 31, 1972, 72.19515**

**Int. Cl.² C07C *49/80***

**U.S. Cl. 260—592** **2 Claims**

1. A 1-phenyl-2-propanone of the formula:



in which A is sulphur.

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**3,965,191**

**PROCESS FOR SYNTHESIZING METHYL GLYOXAL ACETALS**

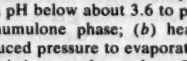
**Shyam K. Gupta, Ledyard, Conn., assignor to Pfizer Inc., New York, N.Y.**

**Continuation of Ser. No. 422,089, Dec. 5, 1973, abandoned. This application Mar. 20, 1975, Ser. No. 560,304**

**Int. Cl.² C07C *45/00***

**U.S. Cl. 260—594** **6 Claims**

1. A process for synthesizing a compound having the formula



wherein R is alkyl having 1–4 carbon atoms, comprising the step of reacting at about 50°–150°C. dihydroxyacetone with at least an equivalent amount of an alkanol having 1–4 carbon atoms in the presence of a catalytic amount of a cation exchange resin produced from an acid having a pK value of less than one.

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**3,965,192**

**HYDROCARBONYLATION PROCESS**

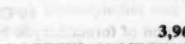
**Frank B. Booth, Placentia, Calif., assignor to Union Oil Company of California, Brea, Calif.**

**Continuation-in-part of Ser. No. 642,191, May 29, 1967, abandoned. This application Aug. 6, 1969, Ser. No. 848,114**

**Int. Cl.² C07C *45/10***

**U.S. Cl. 260—598** **10 Claims**

1. The hydrocarbonylation of a monocyclic, mono-olefin having from 4 to about 18 carbons and the structure:



wherein $R_1$, $R_2$, $R_3$ and $R_4$ are selected from hydrogen and alkyl and wherein one of said $R_1$ and $R_2$ and one of said $R_3$ and $R_4$ together form a single alkylene group having from 2 to about 8 carbons that comprises:

contacting in a reaction zone said mono-olefin, hydrogen and carbon monoxide in the presence of a liquid reaction medium containing a catalyst consisting of $RhH(CO)L_2$, wherein L is an organic ligand having the formula:

wherein;

R′ is a member of the class consisting of alkyl from 1 to 8 carbons, aryl from 6 to 8 carbons; and

at least one of said R' groups is aryl; and
maintaining reaction conditions comprising the temperature of the reaction zone from about 50° to 200°C. and sufficient pressure from 5 to 300 atmospheres to maintain the reaction medium in liquid phase, said conditions being sufficient to effect hydrocarbonylation of said olefin.

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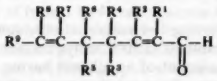
3,965,193

## PRODUCTION OF HIGH MOLECULAR WEIGHT α,β-UNSATURATED ALDEHYDES

Norbert Goetz, Bobenheim-Roxheim, and Roman Fischer, Ludwigshafen, both of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Nov. 1, 1972, Ser. No. 302,650
Claims priority, application Germany, Nov. 17, 1971, 2157035; Oct. 9, 1972, 2249372; Oct. 9, 1972, 2249398
Int. Cl.² C07C 47/38, 47/20, 47/52
U.S. Cl. 260—598 12 Claims

1. A process for the production of high molecular weight α,β-unsaturated aldehydes of the general formula (I):

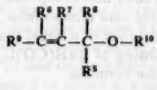


(I)

where

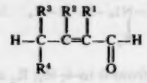
$R^1$ is hydrogen, alkyl of one to four carbon atoms, phenyl or phenyl bearing alkyl of one to four carbon atoms as a substituent;
$R^2$ is hydrogen, alkyl of one to four carbon atoms, phenyl or phenyl bearing alkyl of one to four carbon atoms as a substituent;
$R^3$ is hydrogen or alkyl of one to four carbon atoms;
$R^5$ is hydrogen or alkyl of one to four carbon atoms;
$R^6$ is hydrogen or alkyl of one to four carbon atoms;
$R^7$ is hydrogen or alkyl of one to four carbon atoms;
$R^4$ is hydrogen or a saturated or unsaturated, branched or linear aliphatic or cycloaliphatic hydrocarbon radical of one to twelve carbon atoms;
$R^8$ is alkyl of one to four carbon atoms or (when $R^9$ is phenyl) hydrogen; and
$R^9$ is a saturated or unsaturated branched or linear aliphatic or cycloaliphatic hydrocarbon radical of one to twelve carbon atoms, or phenyl

wherein an allyl compound of the formula (II):



(II)

in which $R^5$ to $R^9$ have the meanings given above and $R^{10}$ is hydrogen or acyl of a carboxylic acid of one to five carbon atoms is reacted in the liquid phase with an α,β-unsaturated aldehyde of the formula (III):



(III)

in which $R^1$ to $R^4$ have the meanings given above, at elevated temperature of about 60°–300°C and in the presence of an acid catalyst wit a pK value of −9 to 6 in such an amount of such acid catalyst that the reaction mixture has a pH of 1 to 7.

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3,965,194

## PRODUCTION OF FORMALDEHYDE IN CARBON STEEL REACTORS

Morgan C. Sze, Upper Montclair, and Harold Unger, Fort Lee, both of N.J., assignors to The Lummus Company, Bloomfield, N.J.

Filed Oct. 19, 1973, Ser. No. 408,106
Int. Cl.² C07C 45/16
U.S. Cl. 260—603 HF 11 Claims

1. In a process for producing formaldehyde by the oxidation of methanol in a carbon steel reactor, the improvement comprising:

treating the surface of the carbon steel reactor prior to said oxidation of methanol to formaldehyde with a passivating amount of a member selected from the group consisting of (a) a mixture of oxygen and sulfur dioxide and (b) hydrogen sulfide, said treatment with hydrogen sulfide being effected in the absence of oxygen on an oxidized carbon steel surface, said treatment being effected at a temperature and for a time to passivate the carbon steel surface with respect to the production of formic acid.

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3,965,195

## PROCESS FOR THE PRODUCTION OF FORMALDEHYDE

Karl Buschmann, Neustadt; Hans Diem, Mannheim; Guenther Matthias, and Friedrich Wodtcke, both of Ludwigshafen, all of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany

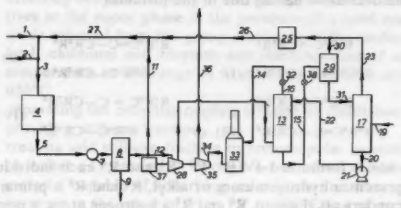
Continuation of Ser. No. 321,549, Jan. 5, 1973, Pat. No. 3,870,740. This application Apr. 23, 1975, Ser. No. 570,801
Claims priority, application Germany, Jan. 13, 1972, 2201434
Int. Cl.² C07C 45/16
U.S. Cl. 260—603 HF 10 Claims

1. In a process for the production of formaldehyde by vaporization of a mixture of methanol and water and then subjecting the methanol in the vapor phase to an oxidizing dehydrogenation in the presence of a catalyst at elevated temperature of from about 550° to 750°C and at a pressure of from 0.5 to 2 atmospheres where a silver catalyst is employed and at a temperature of from about 280° to 420°C where an oxide catalyst is employed, the improvement which comprises carrying out said vaporization in the presence of a solvent mixture of at least one alkanol of from 8 to 24 carbon atoms and at least one dialkylether of from 8 to 24 carbon atoms in each alkyl group, the amount of said solvent mixture being from 0.0001 to 0.8% by weight with reference to said methanol, the amount of said alkanol in this mixture being from 50 to 900% by weight based on the weight of said dialkylether.

## 3,965,196
## HYDROCARBON RECOVERY PROCESS

William Laurence Wood, Farnham, England, assignor to Davy Powergas Limited, England

Continuation-in-part of Ser. No. 235,305, March 16, 1972, Pat. No. 3,914,277. This application Mar. 7, 1975, Ser. No. 556,272
Int. Cl.² C07C 45/04
U.S. Cl. 260—604 R 16 Claims



1. In a process for the preparation of methacrolein by oxidation of isobutane in which the effluent from the oxidation contains unreacted isobutane, carbon oxides, nitrogen, and methacrolein, in which methacrolein is removed from the oxidation effluent, and in which unreacted isobutane is separated from carbon oxides and nitrogen in the oxidation effluent and recycled to the oxidation reaction, the improvement which comprises contacting said oxidation effluent from which methacrolein has been removed with a liquid absorbent to absorb said unreacted isobutane and none or only a minor portion of said carbon oxides and nitrogen, contacting resulting liquid absorbent containing isobutane with nitrogen or a mixture of oxygen and nitrogen as a stripping gas to strip isobutane from said liquid absorbent and obtain a gaseous effluent containing isobutane and stripping gas, and passing said gaseous effluent to said oxidation reaction.

## 3,965,197
## PROCESS FOR THE COMPLETE BROMINATION OF NON-FUSED RING AROMATIC COMPOUNDS

Heinrich Stepniczka, Alma, Mich., assignor to Michigan Chemical Corporation, Chicago, Ill.

Division of Ser. No. 80,122, Oct. 12, 1970, abandoned. This application Jan. 17, 1972, Ser. No. 222,412
Int. Cl.² C07C 39/36, 43/00, 149/32
U.S. Cl. 260—623 H 14 Claims

1. A process for the complete bromination of aromatic compounds on the ring portion thereof, said aromatic compounds having one or more benzene rings and are selected from the group consisting of benzene, toluene, phenol xylene, biphenyl, biphenylether and biphenyl sulfide, comprising the steps of:

a. reacting the aromatic compound with a large excess of liquid bromine in the presence of a bromination catalyst selected from the group consisting of iron, aluminum, iodine, iron halide, and aluminum halide, at from about 10°C. to ambient temperatures to form a reaction mixture with the evolution of gaseous hydrogen bromide, said bromine excess being at least 100 percent of the stoichiometric amount of bromine required for the complete bromination;
b. thereafter refluxing said reaction mixture;
c. maintaining said reflux condition for a time sufficient whereby hydrogen bromide ceases to form; and
d. separating the completely brominated aromatic reaction product from the reaction mixture.

## 3,965,198
## 4-METHYLENE-5-HEXEN-1-OL

Erhard Bertele, Dubendorf, and Peter Schudel, Grut near Wetzikon, both of Switzerland, assignors to Givaudan Corporation, Clifton, N.J.

Division of Ser. No. 436,656, Jan. 25, 1974, which is a division of Ser. No. 742,178, July 3, 1968, Pat. No. 3,872,172. This application July 17, 1975, Ser. No. 596,875
Int. Cl.² C07C 29/02
U.S. Cl. 260—632 R 1 Claim

1. 4-methylene-5-hexen-1-ol.

## 3,965,199
## HYDROGENATION AND HYDROGENOLYSIS OF CARBOHYDRATES WITH TUNGSTEN OXIDE PROMOTED SUPPORTED NICKEL CATALYST

Leon W. Wright, Wilmington, Del., assignor to ICI United States Inc., Wilmington, Del.

Continuation of Ser. No. 247,689, April 26, 1972, abandoned, which is a division of Ser. No. 9,059, Feb. 5, 1970, Pat. No. 3,691,100. This application May 10, 1974, Ser. No. 468,763
Int. Cl.² C07C 29/00
U.S. Cl. 260—635 C 8 Claims

1. A process for the preparation of glycerin from polysaccharide which consists essentially of contacting an aqueous solution of polysaccharide containing from 20% to about 80% by weight of dissolved polysaccharide with hydrogen at a pressure between about 70 atmospheres and about 150 atmospheres, at a temperature from about 180°C to about 250°C and in the presence of a supported nickel catalyst consisting essentially of finely divided metallic nickel and finely divided tungsten oxide supported on an inert carrier wherein the nickel content is from 5% to 45% by weight based on the total weight of nickel, tungsten oxide, and inert carrier and the amount of tungsten in the form of tungsten oxide is from 0.5% to 16% by weight based on the total weight of metallic nickel, tungsten oxide, and inert carrier.

## 3,965,200
## AROMATIC COMPOUND NITRATION CATALYZED BY AROMATIC SULFONIC ACID SUPPORTED ON SOLID CARRIER

Osamu Manabe, and Takashi Kameo, both of Osaka, Japan, assignors to Osaka City, Osaka, Japan

Filed July 13, 1972, Ser. No. 271,407
Claims priority, application Japan, July 13, 1971, 46-52241
Int. Cl.² C07C 79/10
U.S. Cl. 260—645 7 Claims

1. A process for the selective para mononitration of an aromatic compound containing an ortho-para directing substituent wherein said aromatic compound is chlorobenzene, bromobenzene, iodobenzene, toluene, xylene, cumene or biphenyl, said aromatic compound being subjected to nitration in the presence of an aromatic sulfonic acid supported on a solid carrier in a weight ratio of 1 : 1 to 1 : 20.

## 3,965,201
## FLUORINATION OF HEXACHLOROBUTADIENE

Alfred O. Minkiel, Grand Island, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Oct. 11, 1973, Ser. No. 405,723
Int. Cl.² C07C 17/04, 17/20, 21/04
U.S. Cl. 260—653.4 2 Claims

1. A process which comprises the steps or reacting in the vapor phase a mixture comprised of hexachlorobutadiene, hydrogen fluoride and chlorine at a temperature between about 300°C and about 550°C in the presence of a particulate fluorinated alumina catalyst and recovering 2,3-dichlorohexafluorobutene-2 as product, said catalyst being prepared by the steps of dissolving alumina in a strong base, treating the resulting solution with a strong acid, to form a gel, recovering and drying the gel to produce a dried product and, treating the

dried product with hydrogen fluoride at a temperature of between 350° and 500°C to fluorinate the dried product.

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**3,965,202**

## PRODUCTION OF TRICHLORO-ETHYLENE FROM WASTE $C_2$ CHLORINATED HYDROCARBONS

**Herbert Riegel, Maplewood; Morgan C. Sze, Upper Montclair, and Harvey D. Schindler, Fair Lawn, all of N.J., assignors to The Lummus Company, Bloomfield, N.J.**

**Filed June 20, 1973, Ser. No. 371,613**
**Int. Cl.² C07C *21/04***
**U.S. Cl. 260—654 R** **8 Claims**

1. A process for producing a chlorination product selected from the group consisting of trichloroethylene, perchlorethylene and mixtures thereof, comprising:

a. introducing into a separation zone a waste $C_2$ chlorinated hydrocarbon stream derived from the production of vinyl chloride containing said chlorination product and a plurality of $C_2$ chlorinated hydrocarbons convertible to said chlorination product selected from the group consisting of monochlorinated $C_2$ hydrocarbons, dichlorinated $C_2$ hydrocarbons, trichloroethanes, perchloroethanes and pentachloroethane;

b. recovering from the waste stream in said separation zone said chlorination product and said plurality of $C_2$ chlorinated hydrocarbons convertible to said chlorination product;

c. contacting said plurality of $C_2$ chlorinated hydrocarbons with a molten mixture comprising the higher and lower valent chlorides of a multivalent metal and the oxychloride of the metal and a chlorinating agent selected from the group consisting of hydrogen chloride, chlorine and mixtures thereof, said contacting being effected at a temperature of from 700°F to 1200°F to produce a reaction effluent containing said chlorination product and plurality of $C_2$ chlorinated hydrocarbon by-products convertible to said chlorination product selected from the group consisting of monochlorinated $C_2$ hydrocarbons, dichlorinated $C_2$ hydrocarbons, trichloroethanes, perchloroethanes and pentachloroethane;

d. recovering said by-products and said chlorination product; and

recycling the by-products to step (c).

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**3,965,203**

## PROCESS FOR THE PRODUCTION OF 2-CHLOROBUTADIENE-1,3 FROM 3,4-DICHLOROBUTENE-1

**Lawrence A. Smith, Jr., Houston, Tex., assignor to Petro-Tex Chemical Corporation, Houston, Tex.**

**Filed Jan. 31, 1974, Ser. No. 437,906**
**Int. Cl.² C07C *21/20***
**U.S. Cl. 260—655** **11 Claims**

1. In the process for the preparation of 2-chlorobutadiene-1,3 by the dehydrohalogenation of 3,4-dichlorobutene-1 by reaction with a stoichiometric excess of an alkali metal hydroxide and recovery of the 2-chlorobutadiene-1,3, the improvement which comprises:

contacting, a. a temperature of from about 75°C. to about 125°C., the 3,4-dichlorobutene-1 with the alkali metal hydroxide in a two-phase reaction system having an organic phase and an aqueous phase wherein substantially all the reaction occurs in the organic phase of said system; further, wherein the organic phase is from about 40% to about 90% by volume of the entire system, the organic phase being a material selected from primary or secondary alcohols, alkoxyethanols or mixtures thereof which, when added to a two-phase system of 3,4-dichlorobutene-1 and a 20 wt.% brine solution, at equilibrium, has a solubility in the dichlorobutene phase such that the product of the weight percent water and the weight percent organic phase material present in the dichlorobutene phase is greater than 200.

**3,965,204**

## PREPARATION OF DERIVATIVES OF CYCLOBUTANE AND CYCLOBUTENE

**Joachim H. Lukas; Frank Baardman, and Adriaan P. Kouwenhoven, all of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.**

**Filed May 10, 1974, Ser. No. 468,949**
**Claims priority, application United Kingdom, May 10, 1973, 22362/73**
**Int. Cl.² C07C *3/03***
**U.S. Cl. 260—666 A** **16 Claims**

1. A process for the preparation of an alkylidenecyclobutane derivative having one of the formulas

$$R^1R^2C-CR^3R^4 \qquad R^1R^2C=C-CR^3R^4$$
$$R^5R^6C=C-CR^7R^8 \quad \text{(I)}, \qquad R^5R^6C-CR^7R^8 \quad \text{(II)},$$
$$R^1R^2C-CR^7R^8 \qquad R^1R^2C=C-CR^7R^8$$
$$R^5R^6C=C-CR^3R^4 \quad \text{(III) or} \qquad R^5R^6C-CR^3R^4 \quad \text{(IV)}$$

in which formulas I–IV $R^1$, $R^2$, $R^3$ and $R^4$ each individually represent a hydrogen atom or alkyl, $R^5$ and $R^8$ a primary or secondary alkyl group, $R^6$ and $R^7$ a hydrogen atom, a primary or secondary alkyl group, and $R^5$ and $R^6$ each individually may represent a hydrogen atom when $R^7$ represents a primary or secondary alkyl group having at least 2 carbon atoms and $R^8$ a primary or secondary alkyl group, which process comprises contacting an alkene having the formula

$$R^5R^6C=CR^7R^8 \qquad \text{(V)}$$

with an allene having the formula

$$R^1R^2C=C=CR^3R^4 \qquad \text{(VI)}$$

$R^1$, $R^2$, $R^3$, $R^4$, $R^5$, $R^6$, $R^7$ and $R^8$ in the formulas V–VI having the same meanings as in the formula I–IV, in the liquid phase in the presence of a dissolved Lewis acid derived from an element of Group IIIA of the Periodic Table of the Elements, titanium, tin, antimony, tantalum, rhenium, iron or zinc.

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**3,965,205**

## CONVERSION OF LOW OCTANE HYDROCARBONS TO HIGH OCTANE GASOLINE

**William E. Garwood, Haddonfield; John A. Manzoni, Paulsboro; Thaddeus F. Whyte, Jr., Cherry Hill, all of N.J., and John J. Wise, Media, Pa., assignors to Mobil Oil Corporation, New York, N.Y.**

**Filed June 10, 1974, Ser. No. 477,728**
**Int. Cl.² C07C *15/00***
**U.S. Cl. 260—668 R** **12 Claims**

1. A process for producing high octane gasoline which comprises forming a feed by admixing at least one lower aliphatic oxygenated organic alcohol, ether or ketone compound having up to about 8 carbon atoms in its longest hydrocarbon chain with an effective amount up to about 95 volume percent based on the volume of lower aliphatic organic component, of a hydrocarbon fraction having a clear research octane number up to about 85; contacting at about 400° to 1000°F said feed with an aluminosilicate zeolite catalyst having a silica to alumina ratio of at least about 12, a constraint index of about 1 to 12 and a crystal density of not substantially below about 1.6 grams per cubic centimeter; and recovering a product comprising a liquid fraction having a boiling range in the normal gasoline boiling range, a clear research octane number higher than that of the hydrocarbon portion of the feed and containing a major proportion of the carbon content of said feed.

3,965,206

## PRODUCTION OF STILBENE AND STYRENE

Phillip D. Montgomery, Creve Coeur; Richard N. Moore, St. Louis, and Walter R. Knox, Town and Country, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 430,018, Jan. 2, 1974, abandoned. This application Dec. 5, 1974, Ser. No. 529,985

Int. Cl.² C07C *15/10, 15/187*

U.S. Cl. 260—669 R 23 Claims

1. A process for producing stilbene and stilbene derivatives free of polar impurities from toluene and toluene derivatives as the starting hydrocarbon which comprises:

a. effecting dehydrocoupling of toluene and toluene derivatives in the vapor phase in the presence of a solid metal oxide selected from the group consisting of the oxides of lead, cadmium and bismuth and mixtures thereof at a temperature in the range of from about 500°C to about 650°C,

b. separating the dehydrocoupling effluent by distillation to provide a stilbene fraction,

c. treating said stilbene fraction to remove polar impurities by either (1) passing it through a bed of an absorbent material capable of adsorbing polar impurities at a temperature in the range of from 75° to 200°C and at such a rate to provide a contact time of the stilbene and absorbent material of from 0.1 second to 15 minutes, or (2) intimately contacting it with a chemical treating agent selected from the group consisting of alkali metals, alkyl aluminums, aluminum alkoxides, Grignard reagents, metal hydrides, phenyllithium and disodium stilbene, or (3) distilling it to remove all compounds boiling below 128°C, and cooling the distillation residue to effect crystallization; and

d. recovering said stilbene fraction substantially free of polar impurities.

12. The process of producing styrene from toluene as the starting hydrocarbon which comprises:

a. effecting dehydrocoupling of toluene in the vapor phase in the presence of PbO at a temperature in the range of 500° to 650°C,

b. separating the dehydrocoupling effluent by distillation to provide a liquid stilbene fraction,

c. treating said stilbene fraction to remove polar impurities therefrom by either (1) passing it through a bed of an adsorbent material capable of adsorbing polar impurities at a temperature in the range of from 75° to 200°C and at such a rate to provide a contact time of the stilbene and adsorbent material of from 0.1 second to 15 minutes, or (2) intimately contacting it with a chemical treating agent selected from the group consisting of alkali metals, alkyl aluminums, aluminum alkoxides, Grignard reagents, metal hydrides, phenyllithium and disodium stilbene, or (3) distilling it to remove all compounds boiling below 128°C, and cooling the distillation residue to effect crystallization;

d. recovering said stilbene fraction substantially free of polar impurities,

e. effecting reaction of said recovered stilbene fraction in the vapor phase with ethylene in the presence of a disproportionation catalyst at a temperature in the range from 350° to 500°C, and

f. separating and recovering styrene from the catalytic reaction.

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3,965,207

## SELECTIVE PRODUCTION OF PARA-XYLENE

Benjamin Weinstein, Morganville, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 6, 1975, Ser. No. 538,668

Int. Cl.² C07C *3/52*

U.S. Cl. 260—671 M 13 Claims

1. A process for the selective production of para-xylene which comprises reacting toluene with a methylating agent at a temperature between about 575°C and about 750°C in the presence of a catalyst comprising a crystalline aluminosilicate zeolite, said zeolite having a silica to alumina ratio of at least about 12 and a constraint index within the approximate range of 1 to 12.

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3,965,208

## METHYLATION OF TOLUENE

Stephen Allan Butter, East Windsor, and Warren William Kaeding, Westfield, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 6, 1975, Ser. No. 538,666

Int. Cl.² C07C *3/52, 15/08*

U.S. Cl. 260—671 M 24 Claims

1. A process for the methylation of toluene such that the formation of meta-xylene is suppressed and the formation of at least one isomer selected from the group consisting of ortho- and para-xylene is enhanced which comprises contacting toluene with a methylating agent under methylation conditions in the presence of a catalyst comprising a crystalline aluminosilicate zeolite, said zeolite having a silica to alumina ratio of at least about 12, a constraint index within the approximate range of 1 to 12, said catalyst having been modified by the addition thereto of phosphorus, arsenic or antimony in an amount of at least 0.5 percent by weight.

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3,965,209

## SELECTIVE PRODUCTION OF PARA-XYLENE

Stephen Allan Butter, East Windsor, and Lewis Brewster Young, Kendall Park, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 6, 1975, Ser. No. 538,665

Int. Cl.² C07C *3/52, 15/08*

U.S. Cl. 260—671 M 12 Claims

1. A process for the selective production of para-xylene which comprises reacting toluene with a methylating agent in the presence of a catalyst comprising a crystalline aluminosilicate zeolite, said zeolite having a silica to alumina ratio of at least about 12 and a constraint index of from 1 to 12, which catalyst has undergone prior treatment with steam to reduce the alpha value thereof to less than about 500.

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3,965,210

## SELECTIVE PRODUCTION OF PARA-XYLENE AND CATALYST THEREFOR

Chin-Chiun Chu, South Plainfield, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 6, 1975, Ser. No. 538,667

Int. Cl.² C07C *3/52, 15/08*

U.S. Cl. 260—671 M 15 Claims

1. A process for the selective production of para-xylene which comprises reacting toluene with a methylating agent in the presence of a catalyst of a crystalline alumino-silicate zeolite, said zeolite having a silica to alumina ratio of at least about 12 and a constraint index within the approximate range of 1 to 12, the surface of said catalyst having been modified by contact with a polymer made up of meta-carbonate units connected by siloxane units and of a size sufficiently large as to be unable to penetrate the zeolite pore structure.

10. A catalyst consisting essentially of a crystalline aluminosilicate zeolite having a silica to alumina ratio of at least about 12 and a constraint index within the approximate range of 1 to 12, the surface of which has been modified by contact with a polymer made up of meta-carborane units connected by siloxane units and of a size sufficiently large as to be unable to penetrate the zeolite pore structure.

3,965,211

## CURABLE COMPOSITION OF RESIN, CYCLOALIPHATIC EPOXIDE AND AN AMINO COMPOUND

Glyn Islwyn Harris, Stourbridge, England, and Brian George Huckstepp, Glamorgan, Wales, assignors to Albright & Wilson Limited, Oldbury, England

Continuation of Ser. No. 453,875, March 22, 1974, abandoned, which is a continuation of Ser. No. 292,333, Sept. 26, 1972, abandoned. This application Nov. 21, 1974, Ser. No. 525,952

Claims priority, application United Kingdom, Oct. 1, 1971, 45825/71

Int. Cl.² C08G *45/06, 30/16*

U.S. Cl. 260—830 R 26 Claims

1. A curable composition comprising (a) a resin containing free hydroxyl groups which is obtained by the reaction of a compound of formula $R'(CH_2X)_a$ wherein R' is a divalent or trivalent phenylene group, X is an alkoxy group of 1 to 6 carbon atoms or is chlorine, bromine or iodine, and a is 2 or 3, with a molar excess of a phenolic compound, (b) a cycloaliphatic epoxy compound containing at least two 1,2 -epoxide groups per molecule in an amount of 10 – 1,000% of the stoichiometric amount needed to react with all the phenolic groups of the resin, and (c) an amino compound being selected from the group consisting of imidazoles, and triethylene diamine, in an amount of 0.05 – 10% by weight based on the weight of the resin.

3,965,212

## FLAME-RESISTANT RESIN COMPOSITION

Kazumasa Kamada; Ryoji Handa, and Masafumi Hongo, all of Ohtake, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

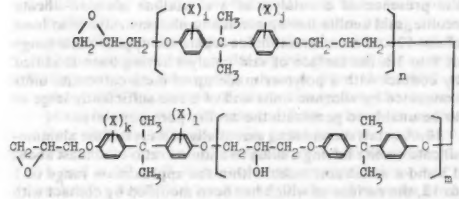
Filed Dec. 3, 1974, Ser. No. 529,080

Claims priority, application Japan, Dec. 4, 1973, 48-134853; May 8, 1974, 49-50218

Int. Cl.² C08G *45/14*

U.S. Cl. 260—835 10 Claims

1. A flame-resistant resin composition consisting essentially of 100 parts by weight of a polytetramethylene terephthalate, 3 to 40 parts by weight of a flame retardant represented by the general formula (I),



(I)

wherein $n + m$, which represents an average degree of polymerization, is a number of 0 to 10; X is a bromine or chlorine atom; and $i$, $j$, $k$ and $l$ are individually an integer of 1 to 4, and antimony trioxide, the weight ratio of said flame retardant to said antimony trioxide being in the range of from 0.25 to 6.

3,965,213

## CONJUGATED DIENE BUTYL

Francis P. Baldwin, Summit, N.J., and Alberto Malatesta, Brussels, Belgium, assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 228,727, Feb. 23, 1972, Pat. No. 3,816,371. This application Apr. 30, 1974, Ser. No. 465,479

The portion of the term of this patent subsequent to June 11, 1991, has been disclaimed.

Int. Cl.² C08L *9/00, 47/00;* C08F *279/02;* C08K *5/10*

U.S. Cl. 260—879 14 Claims

1. A composition of matter consisting essentially of a copolymer consisting of about 70 to about 99.5% by weight of an isoolefin having about 4 to about 7 carbon atoms and about 30 to 0.5% by weight of at least one conjugated diolefin having about 4 to about 14 carbon atoms, said copolymer having conjugated diene groups and a number average molecular weight of about 5,000 to about 500,000.

3,965,214

## FLAME RETARDANT ABS POLYMER COMPOSITIONS

Richard C. Nametz, St. Louis, and Robert J. Nulph, Alma, both of Mich., assignors to Michigan Chemical Corporation, Chicago, Ill.

Continuation of Ser. No. 209,411, Dec. 17, 1971, abandoned. This application Dec. 18, 1972, Ser. No. 315,953

Int. Cl.² C08K *3/22, 5/03;* C08L *55/02*

U.S. Cl. 260—880 R 5 Claims

1. A flame retardant thermoplastic composition comprising an acrylonitrile-butadiene-styrene polymer having incorporated therein a flame retarding mixture consisting of 5 to 25 percent by weight of decabromobiphenyl and 1 to 5 percent by weight of antimony trioxide, all percentages being based on the total weight of said composition.

3,965,215

## COHESIVE SEALANT ARTICLES

Eugene F. Lopez, Sunnyvale, Calif., and Anthony Charles Evans, Brussels, Belgium, assignors to Raychem Corporation, Menlo Park, Calif.

Filed Oct. 31, 1973, Ser. No. 411,462

Int. Cl.² C08L *23/28*

U.S. Cl. 260—889 10 Claims

1. A coherent article essentially comprised of a mastic material uniformly dispersed throughout the interstices of a cross-linked polymeric matrix present in the article in minor proportion sufficient in extent to maintain it coherent at a transition temperature of the matrix.

4. An article according to claim 2 wherein said matrix is polyethylene and wherein said mastic material comprises a polyisobutylene rubber.

3,965,216

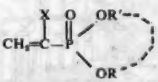
## FIRE RETARDANT CROSSLINKED COPOLYMERS

Jung Il Jin, Irvington, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 291,128, Sept. 21, 1972, Pat. No. 3,842,048. This application July 22, 1974, Ser. No. 490,594
Int. Cl.² C08L 23/02
U.S. Cl. 260—897 C 5 Claims

1. A fire retardant thermoplastic polymer composition consisting essentially of an intimate admixture of at least one poly (alpha-olefin) and from about 5 to 80% of at least one crosslinked copolymer of:

1. from about 2 to 60%, by weight, of at least one polyfunctional ethylenically unsaturated monomer; and
2. from about 3 to 98%, by weight, of at least one bis(hydrocarbyl) vinylphosphonate having the structure:



wherein X is selected from the group consisting of hydrogen, halogen, cyano, aryl, haloaryl, $C_1$–$C_{18}$ alkyl and haloalkyl, and

wherein R and R′ are hydrocarbyl and substituted hydrocarbyl groups which can be the same, different or conjoint.

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3,965,217

## METHOD OF PREPARING STABLE CONDENSATION PRODUCTS AND PRODUCTS FORMED BY THE PROCESS

Kyung S. Shim, Irvington, and Edward N. Walsh, New City, both of N.Y., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Aug. 5, 1974, Ser. No. 494,444
Int. Cl.² C07F 9/09, 9/40
U.S. Cl. 260—928 9 Claims

1. In a process for forming a condensation product which is adapted to be used in a polyurethane foam derived from condensing a $\beta$-haloalkyl ester of a pentavalent phosphorus acid with itself or with an alkyl ester of a pentavalent phosphorus acid to form a condensation product wherein the improvement comprises terminating the condensation reaction when it is from about 35% to 75% complete and performing the condensation in the absence of a nucleophilic initiator to form a stabilized condensation product.

8. A product formed by the process of claim 1.

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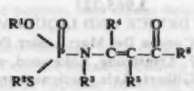
3,965,218

## PHOSPHOROAMIDOTHIOATES

Francis J. Freenor, Richmond, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 394,872, Sept. 6, 1973, Pat. No. 3,882,200. This application Apr. 7, 1975, Ser. No. 565,324
Int. Cl.² C07F 9/24
U.S. Cl. 260—941 9 Claims

1. A compound of the formula



wherein $R^1$ and $R^2$ individually are alkyl of 1 to 6 carbon atoms or alkenyl of 3 to 6 carbon atoms; $R^4$ is hydrogen, alkyl of 1 to 6 carbon atoms or haloalkyl of 1 to 6 carbon atoms and 1 to 3 fluorine, chlorine or bromine; $R^3$ and $R^5$ individually are hydrogen or alkyl of 1 to 6 carbon atoms; $R^6$ is alkoxy of 1 to 6 carbon atoms, alkylthio of 1 to 6 carbon atoms, phenoxy,-phenoxy substituted with 1 to 2 alkyl of 1 to 4 carbon atoms, fluorine, chlorine or bromine, amino, N-lower alkylamino of 1 to 7 carbon atoms, N, N-di-lower alkylamino of 2 to 10 carbon atoms, N-phenylamino or N-lower alkylphenylamino of 1 to 7 carbon atoms.

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3,965,219

## CONTINUOUS PROCESS FOR THE ESTERIFICATION OF PHOSPHONITRILIC CHLORIDE POLYMERS

John W. Ager, Princeton, N.J., and Thomas M. Fekete, Yardley, Pa., assignors to FMC Corporation, Philadelphia, Pa.

Filed Dec. 18, 1974, Ser. No. 533,874
Int. Cl.² C07F 9/00
U.S. Cl. 260—973 7 Claims

1. A continuous process for the esterification of phosphonitrilic chloride polymers comprising reacting (a) a phosphonitrilic chloride polymer of the general formula $(NPCl_2)n$, where n is at least 3, in an inert organic solvent with (b) an alkali metal alkoxide having 1 to 12 carbon atoms in an alkanol solvent, by continuously feeding said reactants to a reaction zone maintained at a temperature of 90 to 125 °C containing a circulating reaction mixture comprising phosphonitrilic ester reaction products and, while adding the reactants, continuously withdrawing said reaction mixture from said reaction zone such that the average residence time of the reactants in said reaction zone is between about 10 and 100 minutes.

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3,965,220

## PREPARATION OF ESTERS OF PHOSPHORUS ACIDS

Ignatius Schumacher, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 156,561, June 24, 1971, abandoned, which is a continuation-in-part of Ser. No. 103,877, Jan. 4, 1971, abandoned. This application May 28, 1974, Ser. No. 473,954
Int. Cl.² C07F 9/08, 9/16, 9/14
U.S. Cl. 260—975 29 Claims

1. The process of preparing a mono- or di-ester of a phosphorus acid containing at least one phosphorus-halogen bond which comprises reacting a phosphorus halide of the formula

wherein

Y represents R or R′O;
R represents alkyl, alkenyl, alkynyl, cycloalkyl cycloalkenyl, cycloalkynyl, heterocyclyl or aryl;
R′ represents alkyl or aryl;
*m* represents 0 when n=3 and 1 when n=2;
*n* represents 2 or 3; and
Z represents chloro or bromo with a compound of the formula

R″OH

wherein

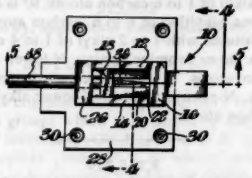
R″ represents aryl at a temperature of from about 85°C. to about 165°C. in the presence of a catalytic amount of pyridine.

3,965,221

## FLUID FLOW DEVICE AND LIQUID METERING

Robert D. Englert, Corona Del Mar; Lester Porter Berriman, Irvine; Kenneth P. Armstrong, Lakewood, all of Calif., and Douglas A. Roe, Gilbert, Ariz., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed July 3, 1974, Ser. No. 485,518
Int. Cl.² F02M 7/20
U.S. Cl. 261—23 A 15 Claims



1. A method for producing a combustible air-liquid fuel mixture having a substantially constant air-to-fuel ratio comprising the steps of passing air through a variable area throat zone to increase its velocity to sonic, varying the area of the throat zone in correlation with operating demands imposed upon the engine for which the mixture is produced, metering fuel from a supply into the air stream at or before the throat zone in direct proportion to the area thereof, sensing the pressure of the high velocity air stream at a point before the throat zone where the cross-sectional area ratio between the variable area throat zone and the plane of the pressure sensing point is constant, and adjusting the rate of fuel delivered into the air stream in response to changes in the air pressure sensed whereby the air-to-fuel ratio of the mixture is maintained substantially constant.

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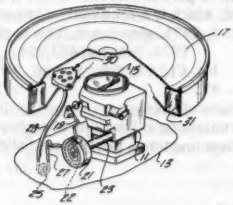
3,965,222

## CARBURETION SYSTEM

Benjamin C. Benjamin, Flint, Mich., assignor to Schmelzer Corporation, Durand, Mich.

Filed Sept. 3, 1974, Ser. No. 502,527
Int. Cl.² F02M 1/10
U.S. Cl. 261—39 B 9 Claims



1. In a carburetion system having a choke, the combination of an air cleaner assembly including a filter, an air temperature responsive choke thermostat for operating the choke, modulating means disposed in said air cleaner assembly and modulating the supply of filtered air to the choke thermostat in accordance with the ambient temperatures in said air cleaner assembly, a heat source for warming the filtered air, a vacuum source connected to the choke thermostat to cause filtered air to be drawn from the air cleaner through the modulating means and the heat source to the choke thermostat, said modulating means including an air inlet positioned in said air cleaner to receive filtered air from said air cleaner, an air outlet operatively connected to the heat source and a temperature responsive means operative in response to the temperature in said air cleaner to vary the quantity of filtered air transferred between the air inlet and the choke thermostat from a minimum to a maximum as temperature in said air cleaner increases to change the temperature response of the thermostat and accordingly the operation of the choke.

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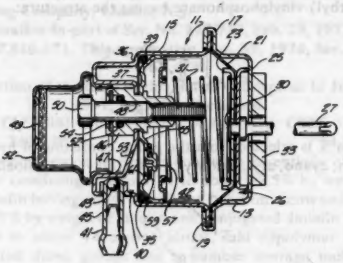
3,965,223

## CHARGE FORMING DEVICE

Benjamin C. Benjamin, Flint, and Glenn A. Schautz, Lennon, both of Mich., assignors to Schmelzer Corporation, Durand, Mich.

Filed Sept. 18, 1974, Ser. No. 507,128
Int. Cl.² F02M 1/10
U.S. Cl. 261—39 B 3 Claims



1. A charge forming device for an internal combustion engine including an induction passage, a choke valve in the passage, a temperature responsive element operatively connected to the choke valve and adapted to urge the valve to a closed position with a force inversely proportioned to the engine temperature, a vacuum responsive device operatively connected to the choke valve and adapted to move the same from a closed position to a variable partially open position at a controlled rate in response to a predetermined vacuum in the engine intake manifold obtained when the engine is operating above cranking speed, said vacuum responsive device including a casing, a flexible diaphragm dividing the casing into two main chambers, resilient means urging the diaphragm and operatively connected choke valve to a closed position, a rigid wall assembly separating one of the main chambers into first and second subchambers, at least one aperture in said rigid wall assembly, a valve member normally engaging said rigid assembly and closing said aperture against air flow from the first subchamber, bypass means permitting restricted fluid flow in either direction between said subchambers, a vacuum passage adapted to connect said second subchamber with a source subject to engine intake manifold vacuum, adjusting means for limiting the extent of movement of the diaphragm and coincident opening of the choke valve, said valve member being axially offset from the axial center of the device and said adjusting means comprising a stop member extending through said rigid wall into said one subchamber, said stop member also being axially offset from the axial center of the device on the opposite side from the flexible valve member.

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3,965,224

## CARBURETOR CHOKE VALVE POSITIONER

Richard J. Freismuth, Mount Clemens, Mich., assignor to Ford Motor Company, Dearborn, Mich.

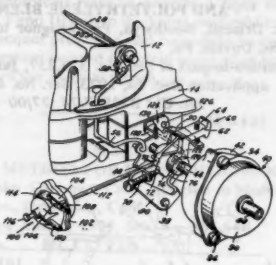
Filed Apr. 1, 1974, Ser. No. 457,049
Int. Cl.² F02M 1/10
U.S. Cl. 261—39 B 9 Claims

1. An automatic choke system for use with a carburetor having an air/fuel induction passage and

an unbalance mounted, air movable, choke valve mounted for variable movement across the passage to control airflow through the passage,

temperature responsive spring means operably connected to the choke valve urging the choke valve towards a closed position with a force increasing as a function of decreases in the temperature of the spring means from a first predetermined level,

power means sensitive to engine manifold vacuum for moving the choke valve from the closed position to a predetermined open position in opposition to the spring means, the predetermined open position being one that is only



slightly opened relative to the closed position and less open than the position attained when the engine has reached a normal operating temperature level, and

locking means operably engagable with the choke valve and rendered operable at all times once the power means has moved the choke valve to the predetermined position to prevent the choke valve from closing to a lesser open position than the predetermined position upon decay of the manifold vacuum below the level establishing the predetermined position of the choke valve.

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**3,965,225**

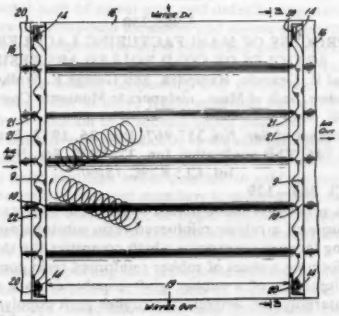
## SPACER-TURBULATOR

**Edward N. Schinner, Silver Spring, Md., assignor to Baltimore Aircoil Company, Inc., Jessup, Md.**

**Filed Mar. 11, 1974, Ser. No. 448,802**

**Int. Cl.² B01F** *3/04*

**U.S. Cl. 261—79 A** **5 Claims**



1. A spacer-turbulator portion of cooling tower corrugated fill sheets for separating said sheets and imparting corkscrew turbulence to air passing between said sheets which comprises:

a. raised mound means at the downstream portion of the spacer-turbulator for maintaining each fill sheet apart from an adjoining sheet, said mound means contacting the fill sheet at the base of a concave portion of the fill sheet and contacting the adjoining fill sheet at the base of its concave portion, said means being in repeating units; and

b. raised means between each of the raised mound means extending from the apex of a convex portion of a fill sheet outward and in opposite directions toward each concave portion of the same fill sheet, said raised means defining with the adjoining fill sheet an air space.

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**3,965,226**

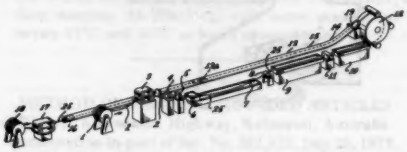
## METHOD OF PROVIDING A THICK CONCENTRIC ENVELOPE ON AN ELECTRICAL CONDUCTOR

**Lothar Werwitzke, Langenhagen; Hans-Dieter Stenzel, Hannover, and Hermann Uwe Voigt, Langenhagen, all of Germany, assignors to Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft, Hannover, Germany**

**Filed Nov. 25, 1974, Ser. No. 526,459**

**Int. Cl.² B29C** *25/00*; **B29F** *3/10*

**U.S. Cl. 264—25** **17 Claims**



1. Method of providing a relatively thick thermoplastic or elastomeric envelope on a conductor, comprising the steps of:

extruding an envelope onto the conductor without counter pressure;

cooling the envelope relatively fast immediately following the extrusion without surface contact of the envelope as between its being extruded and engagement with a cooling fluid, to obtain a stable, supporting sleeve as part of the envelope for maintaining a concentric disposition of the conductor in the envelope;

reheating the envelope under pressure but for such short duration so that only a surface layer of the envelope melts and causing the envelope to solidify on the outside before the envelope has melted all the way through the conductor, to obtain a radially inwardly migrating melting zone followed by radially inwardly migrating resolidification, for a gradual formation of the desired internal texture in the resolidifying envelope; and

said steps being carried out concurrently in a continuous process, on the passing-through conductor, affecting different portions of the enveloped conductor at different times and being carried out directly consecutively as regards the same conductor portion on which the envelope is formed.

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**3,965,227**

## METHOD OF SIMULTANEOUSLY MANUFACTURING ACRYLIC FIBERS AND NITRATES

**Artur Stoy; Vladimir Stoy; Renata Urbanova; Jaroslav Prokop, all of Prague, and Josef Kucera, Pardubice, all of Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia**

**Continuation of Ser. No. 264,451, June 20, 1972, abandoned. This application Oct. 2, 1974, Ser. No. 511,427**

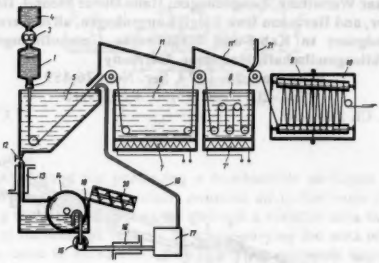
**Claims priority, application Czechoslovakia, June 22, 1971, 4609-71**

**Int. Cl.² D01F** *13/00*

**U.S. Cl. 264—38** **10 Claims**

1. A method of simultaneously producing (1) acrylic filament material by wet spinning nitric acid solutions of acrylic polymers and (2) nitrates from the coagulating bath system, comprising providing a solution of polymers or copolymers containing up to 100% of acrylonitrile units and from 0 to 50 mol percent of units of one or more comonomers copolymer-

izable with acrylonitrile into nitric acid-soluble polymers, introducing said solution into a coagulating bath for wet spinning said solutions into filament material and withdrawing said filament material from said bath, said coagulating bath containing an aqueous solution of nitrates and a constant surplus of neutralizing agents in an amount ranging from about 0.5 to about 5% by weight and sufficient to convert the nitric acid introduced by said polymer solution into nitrates and to make the filament leaving the the coagulating bath free of nitric acid, maintaining the temperature of the coagulating bath at least about 5 degrees above the temperature at which the



solution of the same concentration is saturated with respect to its nitrate content, maintaining the nitrate concentration of the coagulating bath substantially constant during wet spinning by (a) withdrawing a part of said bath equimolar to the amount of nitric acid introduced therein by the wet spinning of said polymer solution, (b) adding a neutralizing agent to said bath at a rate at which nitric acid is introduced into said bath by said polymer solution, and (c) replacing the water lost from said bath, treating said withdrawn part of said bath to recover in solid form at least part of the nitrate found therein and washing, stretching, heat stabilizing and drying said withdrawn filament material.

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**3,965,228**

## CONTINUOUS PRODUCTION OF POLYMERIC FOAM

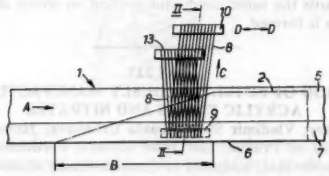
**Nicholas Cornelis Vreenegoor, Hillegom, Netherlands, assignor to Unifoam AG, Glarus, Switzerland**

**Filed June 12, 1974, Ser. No. 478,510**

**Claims priority, application United Kingdom, June 18, 1973, 28884/73**

**Int. Cl.² B29C *11/00*; B29D *27/04***

**U.S. Cl. 264—39** **7 Claims**



1. The method of continuously producing flat-topped polymeric foam, comprising the steps of

a. depositing a foamable thermosetting resin reaction mixture in the non-expanded condition in the bottom of a continuously moving trough conveyor in which the said reaction mixture begins to foam and rise upwardly;

b. contacting each side surface of the rising foam, as the moving trough conveyor passes through a rising station, with a plurality of corresponding upwardly moving wires interposed between each side surface of the rising foam and the adjacent side wall of the moving trough conveyor; and

c. subsequently returning said wires to the moving trough conveyor for engagement with another portion of the foam passing through said rising station in said moving trough conveyor.

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**3,965,229**

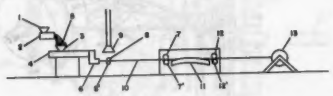
## METHOD OF MANUFACTURING A FOAM FIBRILLATED FIBROUS WEB FROM AN ISOTACTIC POLYPROPYLENE AND POLYETHYLENE BLEND

**Gary L. Driscoll, Boothwyn, Pa., assignor to Sun Ventures, Inc., St. Davids, Pa.**

**Continuation-in-part of Ser. No. 320,237, Jan. 2, 1973. This application Dec. 14, 1973, Ser. No. 425,004**

**Int. Cl.² B29D *7/24*, *27/00***

**U.S. Cl. 264—50** **1 Claim**



1. A process of producing a foam fibrillated fibrous web comprising heating a blend of from 75 to 98 weight percent as based on said blend of isotactic polypropylene and from 25 to 2 weight percent as based on said blend of polyethylene in an extruder to a temperature generally maintained in a range of from 175° to 236°C whereby a molten blend is formed, extruding said blend and from 0.1 to 20 percent by weight as based on said blend of a material which is gaseous under the extrusion conditions used mixed with said molten blend from a die which is generally maintained in the temperature range of from 200° to 235°C into a zone of reduced pressure to produce a foam fibrillated fibrous web extrudate, quenching said extrudate to a temperature below about 150°C while withdrawing said extrudate from said die by a first linear take up means at a linear rate of from 2 to 25 times the linear rate at which said blend reaches the lips of said die whereby a foam fibrillated web is formed, and stretching said foam fibrillated web from 2 to 10 times in the machine direction at a temperature of from about 90°C to about 150°C to increase the strength thereof.

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**3,965,230**

## PROCESS OF MANUFACTURING LACQUERED ARTICLES OF COLD ROLLED ABS RESIN

**Michael R. Grancio, Hampden, and George E. Walker, Longmeadow, both of Mass., assignors to Monsanto Company, St. Louis, Mo.**

**Division of Ser. No. 317,967, Dec. 26, 1972, Pat. No. 3,887,746. This application Jan. 27, 1975, Ser. No. 544,076**

**Int. Cl.² B29C *15/00***

**U.S. Cl. 264—129** **3 Claims**

1. A process of manufacture of an impact resistant ductile composite of a rubber reinforced resin substrate and an embrittling lacquer superstrate which comprises the steps of:

A. forming a sheet of rubber reinforced resin comprising a dispersion of a rubber graft copolymer in a matrix of interpolymer; wherein the rubber graft copolymer comprises a superstrate of an interpolymer of 5–95 parts by weight of a vinylidene aromatic hydrocarbon monomer and 95–5 parts by weight of a unsaturated nitrile monomer on a rubber substrate; wherein the weight ratio of superstrate to substrate is in the range of 10:100 to 250:100; wherein the matrix interpolymer is of the same composition as the superstrate; wherein the reinforcing rubber comprises between 3 and 30 weight percent of the total resin; and wherein the average particle size of the rubber substrate is in the range of 0.01 to 1.5 microns;

said sheet having less than about 5 percent elongation beyond the yield point when coated with an embrittling layer of lacquer.

B. cold rolling the sheet of rubber reinforced resin at a temperature at least about 20°C. below the glass transition temperature of said rubber reinforced resin by passing it successively between cold rolls to reduce the thickness of the sheet to between 95 and 40 percent of the original thickness; and

C. applying lacquer to at least one side of the cold rolled sheet of reinforced resin to provide a layer of lacquer between 0.1 and 10 mils in thickness, said cold rolling and applying lacquer providing said composite having a minimum elongation beyond the yield point of at least about 5 percent of the original length.

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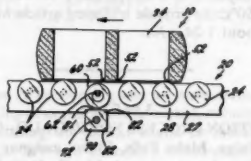
**3,965,231**

## MEANS AND METHOD FOR DEFEATHERING BLOCKS

**Charles W. Depka, Carlsbad, Calif., assignor to Modern Builders Supply Co., Oceanside, Calif.**

**Filed Apr. 7, 1975, Ser. No. 565,646**
**Int. Cl.² F28C *3/06***
**U.S. Cl. 264—161** **13 Claims**



1. Means defeathering the lower portions of cement blocks at a defeathering station, comprising:

a. means supporting and conveying said blocks in a generally horizontal path of travel past said defeathering station,

b. a series of juxtaposed members and means supporting said juxtaposed members on a line below and extending laterally of said path of travel of said blocks at said defeathering station, said means supporting said juxtaposed members permitting them to move freely generally vertically from a first lower position to a second upper position,

c. means operative to periodically strike said justaposed members and to thereby propel said juxtaposed members upwardly from said first lower position to said second upper position, said juxtaposed members in moving from said first lower position to said second upper position thereby striking said lower portions of said blocks and thereby knocking feathers from said blocks,

d. said means supporting said juxtaposed members being a rod disposed transversely of said path of travel of said blocks and disposed therebelow and said juxtaposed members having openings therein in which said rod is positioned and said openings being larger than said rod thereby permitting said juxtaposed members to move from said first lower position to said second upper position,

e. said rod being of circular cross-section and said juxtaposed members being annular members and said openings being circular so that said annular members can rotate on said rod to permit different surfaces to strike said blocks to distribute wear on said annular members, and means mounting said rod free to rotate, the axis of said rod being stationary.

**3,965,232**

## PROCESS FOR THE OBTAINING OF POLY(VINYLIDENE FLUORINE) YARNS AND FIBERS

**Pierre Chion, Bron, and Robert Cuidard, Ecully, both of France, assignors to Rhone-Poulenc-Textile, France**

**Filed May 30, 1974, Ser. No. 474,585**
**Claims priority, application France, June 6, 1973, 73.20666**
**Int. Cl.² C08F *114/00*; D01F *6/00***
**U.S. Cl. 264—184** **6 Claims**

1. A process of making polyvinylidene fluoride yarns and fibers of improved structure and dry tenacity of more than 33 grams/tex, said process comprising:

spinning a solution of polyvinylidene fluoride into a coagulating bath containing 45 to 60% by weight aprotic polar organic solvent and 40 to 55% by weight of water maintained between 15° and 40°C,

stretching the filaments in air between 15°C and 40°C to a ratio of between 1.5*x* and 5*x*, then stretching the filaments in boiling water to a ratio of between 1.5*x* and 4*x*, the overall stretch ratio being between 3*x* and 6.5*x*, and then washing the filaments with water maintained between 15°C and 40°C at room temperature.

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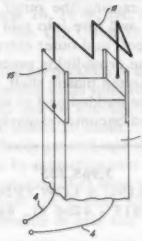
**3,965,233**

## METHOD OF FORMING MOULDED ARTICLES

**Paul Ritter, 76 Brookton Highway, Kelmscott, Australia**

**Continuation-in-part of Ser. No. 382,525, July 25, 1973, abandoned. This application Apr. 14, 1975, Ser. No. 567,998**
**Int. Cl.² B28B *11/04***
**U.S. Cl. 264—219** **10 Claims**



1. A method of molding a coated article comprising: forming a mold from expanded polystyrene and reshaping a molding surface of said polystyrene to provide a configured surface; applying a coloured composition to a molding surface of said polystyrene; filling said mold with a settable hydraulic cement and allowing said cement to harden, applying an organic solvent to said mold to dissolve at least a portion of said polystyrene and said colored composition, causing a portion of said polystyrene, said composition and said solvent to remain on the concrete article, said colored composition being at least partially soluble in said solvent and permitting said solvent to evaporate to form a coloured glazed finish on the surface of said article.

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**3,965,234**

## METHOD OF MAKING RADAR REFLECTIVE BUOY

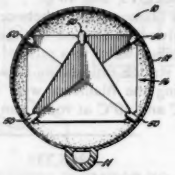
**Noel W. Lane, Jr., 2106 Windmill View Road, El Cajon, Calif. 95020**

**Division of Ser. No. 328,659, Feb. 1, 1973, Pat. No. 3,806,927. This application Oct. 3, 1973, Ser. No. 403,175**
**Int. Cl.² B29B *3/00***
**U.S. Cl. 264—275** **3 Claims**

1. The method of making a seamless and ventless hollow spherical shell of fusible cross-linkable polyolefin, with a rigid radar reflector fixedly molded therein, said radar reflector being formed by 3 mutually perpendicular, flat plates of micro-wave reflective material which define a cluster of 8 tetra-

hedrons, the intersections of each perpendicular pair of plates forming outer corners, said method comprising the steps of:

1. placing said radar reflector within a hollow mold cavity, using a plurality of spring-loaded standoffs attached to said corners, each of said standoffs having two perpendicularly related slots at one end thereof to slidably receive the corners of the respective reflector plates, and a cavity at the intersectin of said slots containing a compression spring that bears at one end against the standoff and at the other end against the reflector plates, said standoffs being molded of the same resin as said shell, but which has been only partially cross-linked;
2. loading a measured quantity of said fusible cross-linkable polyolefin into the mold cavity;



3. closing said mold, thereby slightly compressing said springs;
4. rotating said mold while heating the same above the fusion temperature of said resin, causing the resin particles to melt and form a continuous shell inside the mold cavity, and also causing the outer extremities of said standoffs to melt and fuse into said shell to become an integral part thereof, said outer extremities of the standoffs continuing the cross-linkig process as they fuse and merge with the molten plastic shell; and
5. rapidly chilling the molded part so as to cause the plastic resin to stiffen and become relatively rigid.

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**3,965,235**

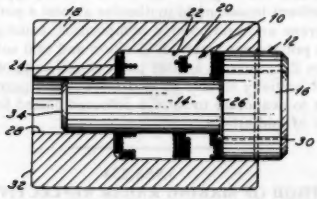
## METHOD OF MAKING A LOW FRICTION BUSHING

**Charles S. White, 35815 - 42nd St., East, Palmdale, Calif. 93550**

**Continuation-in-part of Ser. No. 321,566, Jan. 8, 1973, Pat. No. 3,891,488, which is a continuation-in-part of Ser. No. 76,110, Sept. 28, 1970, abandoned. This application Apr. 8, 1974, Ser. No. 458,559**

**Int. Cl.² B29G 7/00**

**U.S. Cl. 264—294** **4 Claims**



1. A method of making a low friction bushing comprising the steps of:

1. providing a bondable low friction thread impregnated with a bonding resin and cured to the B-stage, wherein the thread is comprised of bondable filaments and polytetrafluoroethylene filaments;
2. winding a continuous strand of the impregnated bondable low friction thread into the shape of a hollow cylinder onto a mandrel thereby forming a wound mandrel;
3. inserting said wound mandrel into a mold and axially compressing said hollow cylinder while cold to partially coalesce the resin and the thread turns into a preform;
4. removing said preform from said mold and said mandrel;
5. inserting said preform into a second mold;
6. heating and axially compressing said preform to further compact the thread turns and to fuse the resin into a solidified C-staged matrix of predetermined size; and
7. removing the thus formed bushing from the second mold.

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**3,965,236**

## POLY(META-PHENYLENE ISOPHTHALAMIDE) POWDER AND PROCESS

**John William Turnbull, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 262,599, June 14, 1972. This application Feb. 24, 1975, Ser. No. 552,033**

**Int. Cl.² B29B 1/14**

**U.S. Cl. 264—319** **2 Claims**

1. A process for fabricating shaped articles from a coalescible and densifiable powder of poly(meta-phenylene isophthalamide) having a bulk density between about 0.02 g./cc. and about 0.4 g./cc. which comprises pressing said powder by subjecting said powder to a forming pressure of at least 10,000 psi. at a temperature up to about 250°C. to provide a preform having a density between about 1.0 g./cc. and about 1.30 g./cc., and sintering said preform by heating said preform in an inert atmosphere to a temperature between about 250°C. and about 350°C. to provide a shaped article having a density of at least about 1.24 g./cc.

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**3,965,237**

## DISSOLUTION PROCESS FOR $ZrO_2$-$UO_2$-CaO FUELS

**Bernice E. Paige, Idaho Falls, Idaho, assignor to The United States of America as repesented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed Apr. 11, 1975, Ser. No. 567,216**

**Int. Cl.² C01G 43/02**

**U.S. Cl. 423—4** **7 Claims**

1. A dissolution process for $ZrO_2$-$UO_2$-CaO-type pressurized water reactor fuels comprising: immersing the $ZrO_2$-$UO_2$-CaO fuel in zirconium-dissolver-product, which is about 6.8 M in fluoride and 1.0 to 1.3 M in zirconium, in a dissolver vessel; and adding nitric acid to said dissolver vessel to facilitate dissolution of the $ZrO_2$-$UO_2$-CaO fuel.

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**3,965,238**

## METHOD OF RECOVERING URANIUM

**Tomokazu Tabata, and Tetsuo Ikushige, both of Shin Nanyo, Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Yamaguchi, Japan**

**Filed July 27, 1973, Ser. No. 383,246**

**Claims priority, application Japan, July 31, 1972, 47-75965**

**Int. Cl.² B01D 11/04**

**U.S. Cl. 423—8** **6 Claims**

1. A process for recovering uranium values from a phosphate rock which comprises

1. acidifying a phosphate rock containing uranium values and at least one other metal value, with a mineral acid so as to obtain a crude acid,
2. solvent extracting said crude acid with an organic solvent so as to separate a raffinate from a relatively pure, wet process, phosphoric acid, and
3. treating said raffinate with an alkali so as to raise the pH to 1–2, whereby uranium hydroxide or phosphate and other heavy metal hydroxides or phosphates are coprecipitated.

## 3,965,239

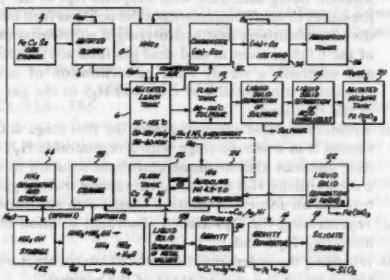
## RECOVERY OF NITRIC ACID SOLUBLE TRANSITION METALS FROM SULFUR AND IRON CONTAINING ORES OF THE SAME

John G. Posel, Everett, Wash., assignor to International Ore Technology, Inc., Everett, Wash.

Continuation-in-part of Ser. No. 416,679, Nov. 16, 1973, abandoned, which is a continuation of Ser. No. 228,069, Feb. 22, 1972, abandoned. This application Apr. 18, 1975, Ser. No. 569,228

Int. Cl.[2] C01G *3/00, 5/00, 9/00, 7/00*

U.S. Cl. 423—34 37 Claims



1. A method of recovering one or more metal values of the group consisting of copper, silver, nickel, cobalt and zinc from a sulfur containing ore of the metal or metals, comprising intermixing the ore and at least a stoichiometric amount of nitric acid of about 30–50% by volume concentration to form an aqueous acid leach solution of the same, heating the solution to a temperature at or above the melting point of sulfur while the solution is contained under pressure in a relatively inert atmosphere, controlling the temperature of the solution to precipitate the sulfur from the solution, relatively separating the sulfur precipitate from the acid soluble phase of the solution, and recovering the metal value or values from the acid soluble phase.

10. A method of recovering one or more metal values of the group consisting of copper, silver, nickel, cobalt and zinc from an iron and sulfur containing ore of the metal or metals, comprising intermixing the ore and at least a stoichiometric amount of nitric acid of about 30–50% by volume concentration to form an aqueous acid leach solution of the same, heating the solution to a temperature at or above the melting point of sulfur while the solution is contained under pressure in relatively inert atmosphere, controlling the temperature of the solution to precipitate the sulfur from the solution, controlling the pH of the solution to precipitate the iron values from the acid soluble phase of the solution, relatively separating the precipitates from the acid soluble phase of the solution, and the acid soluble phase of the solution from the acid insoluble phase thereof, and recovering the metal value or values from the acid soluble phase.

32. In a process of recovering one or more metal values of the group consisting of copper, silver, nickel, cobalt and zinc from a polysulfide ore of the metal or metals, the steps of leaching an aqueous suspension of the ore with at least a stoichiometric amount of nitric acid of about 30–50 percent by volume concentration, while agitating the leach solution in a container pressurized at about at least 50 psi above atmospheric pressure with a relatively inert gas, heating the solution to a temperature of about 115°–125°C, for at least about 30 minutes, crystallizing the sulfur, crystallizing the metal value or values, and recovering the crystals from the solution.

## 3,965,240

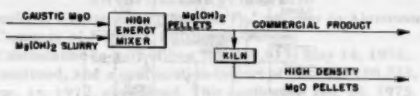
## HIGH DENSITY MAGNESIA PELLET AND METHOD FOR MAKING SAME

Vaughn V. Hughey, Tiffin, Ohio, assignor to Basic Incorporated, Cleveland, Ohio

Filed Dec. 12, 1973, Ser. No. 424,176

Int. Cl.[2] C01F *5/02*

U.S. Cl. 423—155 10 Claims




1. A method of making magnesium hydroxide pellets comprising the steps of mixing caustic magnesia, magnesium hydroxide and water in a rotatable mixing bowl containing a plurality of mixing tools eccentrically placed within the mixing bowl, rotating the mixing bowl about its axis of rotation while simultaneously subjecting the ingredients therein to the action of the rotating mixing tools wherein at least one of said mixing tools is rotated in the direction opposite to the direction of rotation of the mixing bowl, whereby the caustic magnesia hydrates in an exothermic reaction and excess water is driven off to form magnesium hydroxide pellets in the mixing bowl.

## 3,965,241

## LEACHING TREMOLITE IMPURITY FROM TALC

N. Tryggve E. A. Baak, Marina Del Rey, and Dwight L. Harris, Westlake Village, both of Calif., assignors to Cyprus Mines Corporation, West Los Angeles, Calif.

Filed June 16, 1975, Ser. No. 587,175

Int. Cl.[2] C01B *33/24*

U.S. Cl. 423—155 15 Claims

1. A process for the preparation of high purity talc from talc ore containing tremolite as an impurity, which comprises:

crushing said talc ore to provide finely ground talc of a particle size of minus 20 mesh;

combining said finely ground talc with a strong acid;

leaching said talc by subjecting said combination of talc and acid to a temperature of at least 110°C at a pressure of at least 1.5 kg/cm² for a time sufficient to reduce the amount of tremolite in said talc to less than 1.0 weight percent;

prior or subsequent to said leaching step, forming a dilute aqueous slurry of said talc and subjecting said slurry to at least one froth flotation; and

recovering a high purity talc.

## 3,965,242

## METHOD FOR DESULFURIZING EXHAUST GAS BY ALKALI SULPHITE-GYPSUM PROCESS

Tomijiro Morita; Isao Funahashi; Masayoshi Sugai; Atushi Sasakawa, and Masakazu Takaiwa, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 331,879, Feb. 12, 1973, abandoned. This application May 27, 1975, Ser. No. 580,793

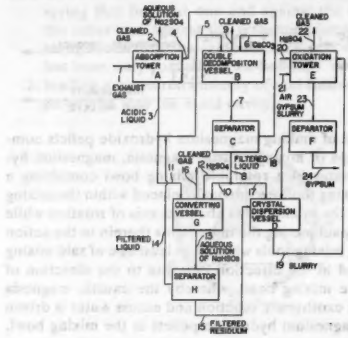
Claims priority, application Japan, Feb. 23, 1972, 47-18760

Int. Cl.[2] C01B *17/56;* C01D *5/14;* C01F *11/46*

U.S. Cl. 423—166 3 Claims

1. In a process for desulfurizing exhaust gas containing oxides of sulfur, including sulfur dioxide, and oxygen, which comprises (a) contact-reacting said exhaust gas with a solution containing an alkali metal sulfite to absorb a major portion of the sulfur dioxide and thus form an absorption liquid containing the alkali metal sulfite, the corresponding alkali metal bisulfite and the corresponding alkali metal sulfate, (b) adding lime or lime stone to the absorption liquid to cause a double decomposition reaction between the lime or lime stone and the alkali metal bisulfite contained in the absorption liquid and thus produce the corresponding alkali metal sulfite

and calcium sulfite, (c) separating the calcium sulfite from the resultant mixture and recycling the filtrate obtained therefrom to step (a), and (d) converting the separated calcium sulfite to produce gypsum, the improvement which comprises suspending a portion of the separated calcium sulfite in a portion of the absorption liquid formed in step (a), while adding sulfuric acid to the resultant suspension to lower the pH value




thereof to from 2 to 4 to (1) convert the alkali metal sulfate contained in said portion of the absorption liquid to the corresponding alkali metal bisulfite and (2) convert the suspended calcium sulfite to gypsum, separating the gypsum from the resultant mixture and recycling the filtrate obtained therefrom to step (b), the remaining portion of the separated calcium sulfite being subjected to oxidation.

## 3,965,243
## RECOVERY OF SODIUM THIOCYANATE

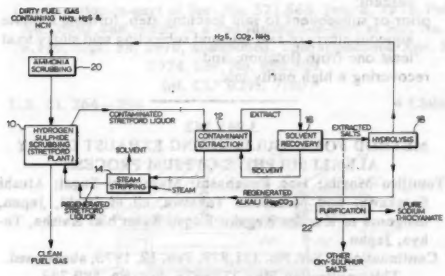
David Krofchak, Cambridge, Canada, assignor to David Krofchak Limited, Cambridge, Canada

Filed Sept. 10, 1974, Ser. No. 504,776

Claims priority, application United Kingdom, Sept. 11, 1973, 42551/73

Int. Cl.² B01D *53/34*; C01C *3/20*

U.S. Cl. 423—226 5 Claims




1. A process for the regeneration of an aqueous alkaline scrubbing liquor which has been used for removal of hydrogen sulphide from fuel gas and which contains alkali thiocyanate which comprises contacting at least a portion of said liquor with an organic extractant for said alkali thiocyanate, said extractant consisting essentially of n-butanol, separating the aqueous phase comprising scrubbing liquor of reduced alkali thiocyanate content from the alkali thiocyanate bearing organic extractant, recycling said liquor of reduced alkali thiocyanate content for re-use as gas scrubbbing liquor, separating alkali thiocyanate from said alkali thiocyanate bearing organic extractant to regenerate said extractant and recycling said regenerated extractant to treat additional used scrubbing liquor.

## 3,965,244
## SELECTIVE REMOVAL OF SULFUR COMPOUNDS FROM ACID GAS MIXTURES CONTAINING SIGNIFICANT QUANTITIES OF CARBONYL SULFIDE

James A. Sykes, Jr., Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Nov. 27, 1974, Ser. No. 527,578

Int. Cl.² B01D *53/34*

U.S. Cl. 423—228 15 Claims

1. A continuous process for selective removal of sulfur compounds from a feed gas mixture containing $CO_2$, $H_2S$ and at least 50 parts per million of COS which comprises;

a. contacting said feed gas mixture in a first stage at a temperature of from 50°C to 90°C with an aqueous polyalkanolamine solution containing at least 20% by weight of a tetramethylene sulfone, said aqueous polyalkanolamine solution being saturated with $CO_2$ and $H_2S$ at the partial pressures of said components in the acid gas feed mixture, thereby absorbing and hydrolyzing a substantial portion of the COS present in said acid gas feed mixture to form and maintain a steady state concentration of acid gas consisting substantially of $CO_2$ and $H_2S$ in the gas phase of the first stage;

b. withdrawing said gas phase from the first stage and contacting it in a second stage with a regenerable $H_2S$-selective, aqueous alkanolamine absorbent solution to afford a substantially $H_2S$-free, $CO_2$-containing treated gas mixture and an absorbent solution loaded with absorbed $H_2S$;

c. regenerating the $H_2S$-loaded absorbent solution thereby liberating $H_2S$; and,

d. returning the regenerated absorbent into contact with the gas phase in the second stage of the process.

## 3,965,245
## METHOD FOR PREPARING ALKALI METAL ORTHOPHOSPHATES AND AMMONIA IN A SINGLE STEP

Bernard H. Nicolaisen, Houston, Tex., assignor to Olin Corporation, New Haven, Conn.

Filed Dec. 30, 1974, Ser. No. 537,234

Int. Cl.² C01B *15/16*, *25'26*; C01C *1/02*

U.S. Cl. 423—312 19 Claims

1. A process for preparing a substantially ammonia-free solution of alkali metal orthophosphate and simultaneously recovering ammonia comprising:

a. contacting a selected ammonium phosphate with sufficient [illegible] metal hydroxide to provide an aqueous reaction mixture having a desired alkali metal/P molar ratio in the range of 1–2,

b. passing said reaction mixture downward in countercurrent contact with ammonia and inert stripping gases at elevated temperature and at a pressure in the range of 130–500 p.s.i.g. in a substantially vertical column having vapor-liquid contact means,

c. withdrawing from said column an overhead product comprising said ammonia and separately withdrawing therefrom a bottoms product comprising an aqueous solution of alkali metal orthophosphate having said alkali metal/P molar ratio and being substantially free of ammonia.

## 3,965,246
## PROCESS FOR THE PRODUCTION OF AMMONIA USING ALIGNED CATALYST PARTICLES

Helmut Hinrichs, Leonding near Linz, Austria, assignor to Chemie Linz Aktiengesellschaft, Austria

Filed Feb. 19, 1974, Ser. No. 443,523

Claims priority, application Germany, Feb. 19, 1973, 2308101

Int. Cl.² C01C *1/04*

U.S. Cl. 423—361 6 Claims

1. In a process for carrying out the catalytic high pressure synthesis of ammonia using the gaseous reactants hydrogen

and nitrogen in the presence of a fused iron oxide catalyst which is reduced to iron at the beginning of the synthesis of ammonia the improvement which comprises passing the gas through layers of said iron catalyst which consists predominately or entirely of particles of which the length of one spatial dimension is 2 to 20 times the length of at least one of the smaller spatial dimensions perpendicular thereto, and at least one of the smaller spatial dimensions is from 1 to 5 mm long, the catalyst being arranged in at least one cylindrical catalyst bed in a manner that the particles are orientated with their longest spatial dimension substantially parallel to the direction of flow of the gas.

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**3,965,247**

## RECOVERY OF SODIUM NITRITE FROM BY-PRODUCT PROCESS LIQUORS CONTAINING SODIUM CHLORIDE

**Clarence Frederick Hecklinger, Camillus, and Donald Edward Crook, Auburn, both of N.Y., assignors to Allied Chemical Corporation, New York, N.Y.**

**Filed June 20, 1975, Ser. No. 588,740**
**Int. Cl.² C01B *21/50***
**U.S. Cl. 423—385** **10 Claims**

1. A process for recovering sodium nitrite from an aqueous solution containing dissolved therein sodium nitrite and sodium chloride which comprises: subjecting said aqueous solution to crystallization in a first crystallization zone under conditions sufficient to effect crystallization of sodium chloride from said solution, including operating temperatures of from about 110° to 130°C, to form a first slurry containing sodium chloride crystals; separating said sodium chloride crystals from said first slurry to form a solution containing dissolved sodium nitrite; subjecting said sodium nitrite solution to crystallization in a second crystallization zone under conditions sufficient to effect crystallization of sodium nitrite from said solution, including operating temperatures of from about 10° to 60°C, to form a second slurry containing sodium nitrite crystals; and recovering said sodium nitrite crystals from said second slurry.

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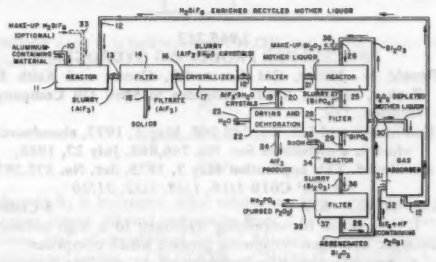
**3,965,248**

## REMOVAL OF $P_2O_5$ FROM ALUMINUM FLUORIDE ENRICHED CRYSTALLIZATION MOTHER LIQUORS

**Tadeusz K. Wiewiorowski, and Michael O. Nutt, both of New Orleans, La., assignors to Freeport Minerals Company, New York, N.Y.**

**Filed Aug. 12, 1974, Ser. No. 496,447**
**Int. Cl.² C01F *7/50*; C01B *25/26*; C01G *29/00***
**U.S. Cl. 423—489** **7 Claims**




1. In a method for preparing aluminum fluoride, which comprises reacting an aluminum-containing material with a $P_2O_5$ contaminated inorganic fluorine acid to produce an aqueous solution of aluminum fluoride, subjecting the solution to crystallization to recover crystals of hydrated aluminum fluoride, separating the crystals from an aluminum fluoride enriched crystallization mother liquor which contains $P_2O_5$ values, and recycling the separated mother liquor to the process, the improvement which comprises: treating the separated mother liquor prior to recycling with a material which provides bismuth ions therein in an amount which insures a $Bi/PO_4$ mole ratio of about 1.0 to 1.05, while the acidity of the mother liquor is less than about 5%, expressed as weight percent $H_2SiF_6$, to essentially quantitatively precipitate the $P_2O_5$ values as bismuth phosphate; and separating the treated mother liquor from the bismuth phosphate precipitate.

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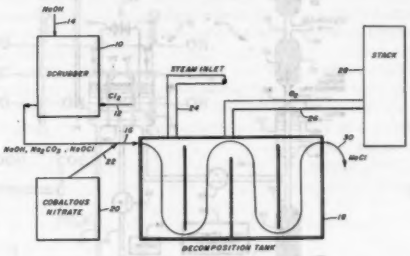
**3,965,249**

## ANTI-POLLUTION METHOD

**Donald L. Kinosz, Lower Burrell, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 469,819, May 14, 1974, abandoned, and a continuation-in-part of Ser. No. 290,223, Sept. 18, 1972, abandoned. This application Jan. 20, 1975, Ser. No. 542,109**
**Int. Cl.² C01B *11/06***
**U.S. Cl. 423—497** **5 Claims**




1. A process for treating chlorine-containing gas to convert the chlorine therein to a chloride which comprises:

a. scrubbing chlorine-containing gas with an aqueous base selected from the class consisting of an alkali metal compound or an alkaline earth metal compound to convert the chlorine therein to a hypochlorite; solution and

b. decomposing said hypochlorite substantially continuously in the resulting solution

1. at a pH maintained between 7–13
2. at a temperature maintained between 20°C and the boiling point of the solution and
3. in the presence of from about 9–1000 ppm based on weight of the hypochlorite solution of an unsupported catalyst selected from the class consisting of cobalt, nickel, copper or calcium, in the form of a salt, fused metal, or metal powder which is converted into a finely divided oxide while converting said hypochlorite into chloride while inhibiting release of free chlorine gas.

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**3,965,250**

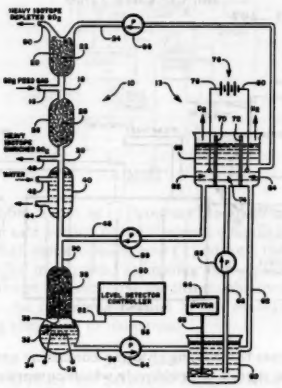
## SEPARATION OF SULFUR ISOTOPES

**Robert DeWitt, Centerville; Bernhart E. Jepson, Dayton, and Roger A. Schwind, Centerville, all of Ohio, assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Division of Ser. No. 322,566, Jan. 10, 1973, Pat. No. 3,869,255. This application July 3, 1974, Ser. No. 485,652**
**Int. Cl.² B01D *59/32*; C01B *17/48***
**U.S. Cl. 423—539** **5 Claims**

1. A method for separating different isotopes of sulfur contained in a sulfur dioxide feed gas wherein the chemicals used for the separation processes are reacted, regenerated and reused with said feed fluid comprising; contacting and reacting said feed gas with a material selected from the group consisting of sodium hydroxide at a molarity between about 1 and about 6 molar, potassium hydroxide at a molarity between about 1 and about 6 molar, and ammonium hydroxide at a molarity between about 1 and about 12 molar, at a tempera-

ture of from about 20°C. to 100°C. to form a hydrogen sulfite ($HSO_3^-$) reaction product, continuing said contacting of said feed gas and said material to effect exchange of the heavier isotopes of sulfur in said sulfur dioxide feed gas with lighter isotopes of sulfur in said hydrogen sulfite reaction product, said contacting and isotope exchange yielding said hydrogen sulfite reaction product enriched in the heavier isotopes of sulfur, removing reacted feed gas depleted in said heavier isotopes, contacting at a temperature of from 25°C. to 70°C. said hydrogen sulfite ($HSO_3^-$) reaction product enriched in said heavier isotopes of sulfur with sulfuric acid at a molarity between about 1 molar and about 6 molar to form a subsequent sulfur dioxide gas enriched with the heavier of said isotopes of sulfur and hydrogen sulfate ($HSO_4^-$) reaction



product, removing said subsequent sulfur dioxide gas enriched with a heavier of said isotopes, contacting said hydrogen sulfate ($HSO_4^-$) reaction product with said material at a temperature of from 25°C. to 100°C. to form a separate sulfate reaction product, passing an electrical current through said separate sulfate reaction product at a temperature of from 20°C. to 100°C. to dissociate said separate sulfate reaction product into anions and cations, effecting migration of said cations through a cation permeable membrane to form said material, and effecting migration of said anions through an anion permeable membrane to form said sulfuric acid, and recycling said material and said sulfuric acid to contact and react with additional quantities of said sulfur dioxide feed fluid.

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**3,965,251**

## METHOD OF REGENERATING A DEGRADED WORKING SOLUTION FOR THE PRODUCTION OF HYDROGEN PEROXIDE

**Hiroshi Shin; Junichiro Sugano, both of Yokkaichi; Tadashi Yoshii, Tokyo; Kichiro Iwamoto, Yokkaichi; Yasuhisa Kuriyama, Yokkaichi, and Minoru Kakuda, Yokkaichi, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan**

**Continuation-in-part of Ser. No. 172,244, Aug. 16, 1971, abandoned. This application Aug. 2, 1973, Ser. No. 384,846**
**Claims priority, application Japan, Aug. 18, 1970, 45-71894**
**Int. Cl.² C01B *15/02***
**U.S. Cl. 423—588** **4 Claims**

1. A method for regenerating a degraded working solution for the production of hydrogen peroxide by an auto-oxidation process employing an anthraquinone, which comprises:

contacting at a temperature of below 130°C, but a temperature sufficient to convert non-effective anthraquinone to effective anthraquinone, and in the presence of a catalyst comprising a metal selected from the group consisting of platinum group metals supported on an alkaline earth metal oxide carrier selected from the group consisting of CaO, MgO, $Al_2O_3$, $CaO.Al_2O_3$, $MgO.SiO_2$, and $MgO.Al_2O_3$, said degraded working solution, which comprises more than 0.02 moles of non-effective anthraquinone per liter of working solution and tetrahydroanthraquinone, with an olefinic compound whose hydrogenation product is gaseous at said contact temperature to accelerate regeneration of non-effective anthraquinone faster than the dehydrogenation reaction of tetrahydroanthraquinone to convert substantially all non-effective anthraquinone to anthraquinone and removing the hydrogenation product of the olefinic compound; and

subsequently contacting the thus treated working solution at a temperature above 130°C., said temperature being sufficient to promote the dehydrogenation reaction of said tetrahydroanthraquinone, and in the presence of said catalyst, with an olefinic compound whose hydrogenation product is gaseous at said contact temperature to dehydrogenate said tetrahydroanthraquinone without incurring any impedance of the dehydrogenation reaction and removing the hydrogenation product of the olefinic compound.

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**3,965,252**

## HYDROGEN PRODUCTION

**Ronald A. Kmecak, and Stephen M. Kovach, both of Ashland, Ky., assignors to Ashland Oil, Inc., Ashland, Ky.**

**Continuation-in-part of Ser. No. 327,010, Jan. 20, 1973, abandoned, which is a division of Ser. No. 92,243, Nov. 23, 1970, Pat. No. 3,725,246, which is a continuation of Ser. No. 769,727, Oct. 22, 1968, abandoned. This application Sept. 23, 1974, Ser. No. 508,193**
**Int. Cl.² C01B *1/18***
**U.S. Cl. 423—651** **5 Claims**

1. A process for the production of hydrogen, comprising contacting paraffinic hydrocarbons consisting essentially of $C_2$ to $C_8$ hydrocarbons with a catalyst consisting essentially of a catalytic amount of a Group VIB metal of the Periodic System, and a promoting amount of Group IA metal of the Periodic System, both deposited on an enert oxide carrier, at a temperature between about 900°F. and about 1250°F, an absolute pressure of between about 100 and 2500 mm of mercury, and a gas hourly space velocity of about 20 to about 2930 volumes of gaseous hydrocarbon feedstock, computed at 60°F. and 1 atmosphere, per unit volume of catalyst per hour, liquefying the effluent product and flashing a dry gas portion containing hydrogen therefrom.

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**3,965,253**

## PROCESS FOR PRODUCING HYDROGEN

**Donald W. Miller, Old Greenwich, Conn., and Keith E. Zarker, Orinda, Calif., assignors to Shell Oil Company, Houston, Tex.**

**Continuation of Ser. No. 248,965, May 1, 1972, abandoned, which is a division of Ser. No. 746,848, July 23, 1968, abandoned. This application May 7, 1975, Ser. No. 575,297**
**Int. Cl.² C01B *1/16, 1/18, 1/32, 31/20***
**U.S. Cl. 423—652** **5 Claims**

1. A process for supplying hydrogen to a high pressure catalytic hydrogen-consuming process which comprises:

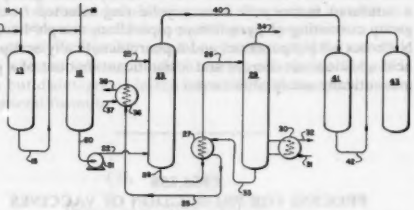
A. partially oxidizing hydrocarbon to produce a carbon monoxide and hydrogen-containing gas,

B. reacting the carbon monoxide and hydrogen-containing gas with water to produce a carbon dioxide and hydrogen-containing gas,

C. centrifugally compressing said carbon dioxide and hydrogen-containing gas to a carbon dioxide partial pressure of at least 180 psi,

D. contacting the resultant compressed gas with an absorbing liquid consisting essentially of diisopropanolamine, a cyclotetramethylene sulfone and water to produce an

absorber effluent gas that is substantially free of carbon dioxide, said effluent gas being at a pressure which at least approximates that of the high pressure hydrogen-consuming process,



E. introducing said absorber effluent gas into said hydrogen-consuming process.

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## 3,965,254
## COMPOSITIONS FOR THE TREATMENT OF CALCIFIC TUMORS

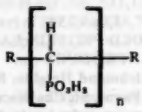
**Andrew John Tofe, and Marion David Francis, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Continuation-in-part of Ser. No. 362,971, May 23, 1973. This application Nov. 15, 1974, Ser. No. 524,013**

**Int. Cl.² A61K *43/00*; C07F *9/02***

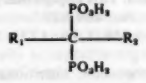
**U.S. Cl. 424—1** **15 Claims**

1. A sterile dilute composition in unit dosage form comprising from about 2 to 20 millicuries of a $^{32}P$ or $^{33}P$ tagged polyphosphonate compound suitable for the treatment of calcific tumors selected from the group consisting of:



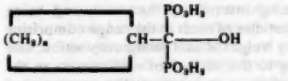
I.

wherein each R is hydrogen or $CH_2OH$ and n is an integer of from 3 to 10;



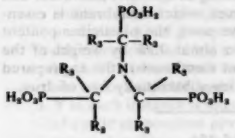
II.

wherein $R_1$ is hydrogen, alkyl containing from 1 to about 20 carbon atoms, alkenyl containing from 2 to about 20 carbon atoms, aryl, phenylethenyl, benzyl, halogen, hydroxyl, amino, substituted amino, $-CH_2COOH$, $-CH_2PO_3H_2$, $-CH(PO_3H_2)(OH)$, or $-CH_2C(PO_3H_2)_2$-H where *n* is 1 to 15, $R_2$ is hydrogen, lower alkyl, amino benzyl, halogen, hydroxyl, $-CH_2COOH$, $-CH_2PO_3H_2$, or $-CH_2CH_2PO_3H_2$;



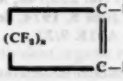
III.

wherein *n* is an integer of from 3 to 9;



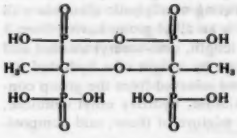
IV.

wherein each $R_3$ is hydrogen or lower alkyl (e.g., methyl, ethyl, propyl and butyl);

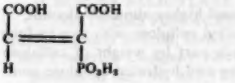


V.

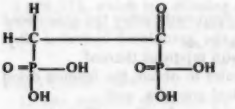
wherein *n* is an integer of from 2 to 4;



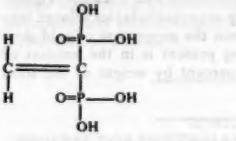
VI.



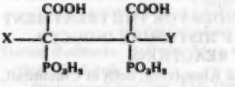
VII.



VIII.



IX.



X.

wherein X and Y are each hydrogen or hydroxy; and the pharmaceutically acceptable salts of each of the foregoing acids.

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## 3,965,255
## CONTROLLED DRUG RELEASING PREPARATIONS

**Rene Bloch, Savion; Ora Kedem, Rehovoth, and Ester Löbel, Hulon, all of Israel, assignors to E. E. Eljim Ecology Ltd., Rehovoth, Israel**

**Filed May 1, 1974, Ser. No. 466,018**

**Int. Cl.² A61K *9/22*, *9/24*, *9/32*, *9/58***

**U.S. Cl. 424—19** **9 Claims**

1. A zero order release rate drug releasing preparation adapted for oral administration and for the controlled release of the drug contained therein at a substantially constant release rate during the first hour after administration and for several hours thereafter, which preparation comprises a drug body encapsulated in or coated with an outer solvent member, said drug body being selected from the group consisting of pure drug and drug admixed with an additional substance or substances which do not substantially influence the zero order release rate of the drug in said drug releasing preparation, and

said solvent membrane comprising at least one plasticizer and at least one reinforcing polymer, which membrane is essentially insoluble in the digestive tract, the plasticizer content constituting from about 40 to about 90% by weight of the solvent membrane, said solvent membrane in the as prepared drug releasing preparation being substantially free of drug.

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3,965,256

## SLOW RELEASE PHARMACEUTICAL COMPOSITIONS

**Stewart Thomas Leslie, Aberdeen, Scotland, assignor to Synergistics, New York, N.Y.**

**Continuation-in-part of Ser. No. 253,746, May 16, 1972, abandoned. This application June 5, 1974, Ser. No. 476,351**

**Int. Cl.² A61K** *9/22*

**U.S. Cl. 424—22** **5 Claims**

1. A slow release pharmaceutical tablet comprising a therapeutically sufficient quantity of a pharmacologically active compound, a slow release pharmaceutical composition comprising two to four parts by weight of a higher aliphatic alcohol selected from the group consisting of aliphatic alcohols with the formula ROH, wherein R is an alkyl group having from 8 to 18 carbon atoms in chain length, ceto-stearyl alcohol and mixtures of these, and one part by weight of a hydrated hydroxy alkyl cellulose compound selected from the group consisting of hydroxy methyl cellulose, hydroxy ethyl cellulose, hydroxy propyl cellulose and mixture of these, said composition being formed by:

a. melting and granulating said higher aliphatic alcohol,

b. hydrating said hydroxy alkyl cellulose with two to four volumes of water for each part by weight of cellulose compound and granulating said hydrated cellulose compound,

c. blending the active ingredient with either the granulated melt of step (a) or with the granulated hydrated alkyl cellulose of step (b) or with mixtures thereof,

d. drying the blend of granules to obtain the formed dried slow release pharmaceutical granules, and

e. compressing the granules admixed with a sufficient quantity of a pharmaceutically acceptable tablet diluent into compressed tablets wherein the proportion of said slow release composition being present is in the amount of from 20 percent to 30 percent by weight of the total weight of the tablet.

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3,965,257

## COMPOSITIONS AND METHODS FOR THE TREATMENT OF THE SYMPTOMS OF HISTAMINE INDUCED ALLERGIC REACTIONS

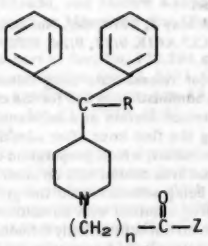
**Albert A. Carr, and C. Richard Kinsolving, both of Cincinnati, Ohio, assignors to Richardson-Merrell Inc., Wilton, Conn.**

**Division of Ser. No. 221,823, Jan. 28, 1972, Pat. No. 3,806,526. This application Jan. 28, 1974, Ser. No. 437,161**

**Int. Cl.² A61K** *31/535*

**U.S. Cl. 424—45** **27 Claims**

1. A pharmaceutical composition in unit dosage form containing from about 1 to 5 milligrams of a compound of the formula




wherein R is selected from the group consisting of hydrogen and hydroxy; n is a positive integer of from 1 to 3; and Z is selected from the group consisting of thienyl, phenyl, and substituted phenyl wherein the substituents on the substituted phenyl may be attached at the ortho, meta, or para positions of the substituted phenyl ring and are selected from the group consisting of a halogen atom, a straight or branched alkyl chain of from 1 to 4 carbon atoms, a lower alkoxy group of from 1 to 4 carbon atoms, a di(lower)alkylamino group, and a saturated monocyclic heterocyclic ring selected from the group consisting of pyrrolidino, piperidino, morpholino, and N-(lower)alkylpiperazino; and a pharmaceutically acceptable acid addition salt thereof and a significant amount of a pharmaceutically acceptable carrier.

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3,965,258

## PROCESS FOR PRODUCTION OF VACCINES

**William J. McAleer, Ambler; Kenneth L. Posch, Lansdale, both of Pa.; Clarence L. Baugh, Lubbock, Tex., and Raymond E. Spier, Merron Guilford, England, assignors to Merck & Co., Inc., Rahway, N.J.**

**Continuation-in-part of Ser. No. 420,478, Nov. 30, 1974, abandoned, which is a continuation of Ser. No. 191,835, Oct. 22, 1971, abandoned. This application Apr. 16, 1975, Ser. No. 568,493**

**Int. Cl.² A61K** *39/12*; **C12B** *1/00*; **C12K** *5/00, 7/00*

**U.S. Cl. 424—89** **7 Claims**

1. A large scale tank process for producing a live virus vaccine for immunization of chickens against Marek's disease which comprises

incubating a mixture of viral-free cells, growth medium and isolated turkey herpes virus in a multi-plate apparatus which comprises a plurality of discs mounted on a rotable shaft, the incubation being started before any substantial cell growth has taken place in the multi-plate apparatus,

continuing the incubation until a satisfactory virus level is obtained, and

harvesting the virus.

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3,965,259

## CANNED EXPANDED PROTEIN LATTICE FOOD PRODUCT

**Thomas B. Coppage, Richmond Heights; Ronald J. Flier, Ladue, and Bernard M. Payne, St. Charles, all of Mo., assignors to Ralston Purina Company, St. Louis, Mo.**

**Division of Ser. No. 376,857, July 5, 1973, Pat. No. 3,865,966, which is a continuation-in-part of Ser. No. 280,539, Aug. 14, 1972, abandoned, which is a continuation of Ser. No. 5,983, Jan. 26, 1970, abandoned. This application July 18, 1974, Ser. No. 489,629**

**Int. Cl.² A23K** *1/10*; **A23L** *1/31*

**U.S. Cl. 426—90** **10 Claims**

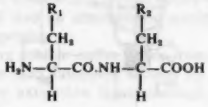
1. A complete maintenance, nutritionally balanced food composition resembling a canned all meat animal food composition in appearance, comprising a protein component of both vegetable and meat origin, the vegetable portion of said protein component being expanded soybean fiber chunks having an expanded meat-like lattice in the amount of up to about 25% by weight of said food composition, said chunks being uniformly distributed throughout said composition, and impregnated with moisture, oils and flavors to impart a natural meat texture and flavor thereto, and said meat portion of said protein component being intermixed therewith and being substantially uniform particles of meat in the range comprising about 9 to about 70% by weight of said food composition, said meat particles adhering to the surface of said chunks so the food composition remains as a substantially unsegregated mass when removed from its container.

## 3,965,260
## ANTI-INFLAMMATORY DIPEPTIDE

John N. McArthur, Toronto, Canada; Peter D. Dawkins, Taunton, and Mervyn J. H. Smith, London, both of England, assignors to John N. McArthur, Toronto, Canada

Filed July 7, 1975, Ser. No. 593,672
Int. Cl.² A61K *37/00*
U.S. Cl. 424—177 13 Claims

1. A method for the treatment of inflammation in a mammal which comprises administering to such mammal an effective amount of a composition comprising: a dipeptide or a pharmaceutically-acceptable salt thereof surrounded by a coating of an enteric substance which resists dissolution in gastric fluids but disintegrates in the intestine, said dipeptide having the general formula:



wherein $R_1$ and $R_2$ are the same or different and each is either phenyl or indolyl.

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## 3,965,261
## METHOD FOR TREATING PAPILLOMAS

John L. Gainer, Charlottesville, Va., assignor to University of Virginia, Charlottesville, Va.

Filed Apr. 29, 1975, Ser. No. 572,631
Int. Cl.² A61K *31/70*
U.S. Cl. 424—180 5 Claims

1. A method for the treatment of Papillomas on a mammal which comprises administering to a mammal in need of said treatment an anti-Papilloma effective amount of a water soluble carotenoid.

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## 3,965,262
## METHOD OF ENHANCING LEARNING AND/OR MEMORY IN WARM BLOODED ANIMALS

Paul Gordon, Chicago, Ill., assignor to Strategic Medical Research Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 337,134, March 1, 1973, and a continuation-in-part of Ser. No. 424,786, Dec. 14, 1973. This application Apr. 29, 1974, Ser. No. 465,339
Int. Cl.² H01N *9/00*
U.S. Cl. 424—180 34 Claims

1. A method of enhancing learning or memory in a warm blooded animal which consists essentially of administering thereto a therapeutically effective amount to enhance the ability of the animal to learn tasks or to enhance the ability of the animal to memorize information of a substance selected from the group consisting of

I. ethereally monosubstituted monosaccharides having the formula $S_1—O—Y$ and therapeutically effective and pharmaceutically acceptable organic acid and inorganic acid salts thereof, and

II. ethereal monosubstitutions of monosaccharide derivatives having the formula $S_2—O—Y$ and therapeutically effective and pharmaceutically acceptable organic acid and inorganic acid salts thereof,

Wherein:

1. $S_1$ is the residue of a non-derivatized monosaccharide selected from the group consisting of pentoses, hexoses and heptoses,

2. $S_2$ is the residue of a monosaccharide selected from the group consisting of pentoses, hexoses and heptoses which has been derivatized with a substance selected from the group consisting of (a) an aliphatic alcohol containing 1–18 carbon atoms to produce an acetal group at the site of an available hydroxyl residue, (b) an aldehyde containing 1–18 carbon atoms to produce an acetal group at the site of an available hydroxyl residue, (c) a ketone containing 1–18 carbon atoms to produce a ketal group at the site of an available hydroxyl residue, and (d) an organic acid residue containing 1–18 carbon atoms to produce an ester group at the site of an available hydroxyl residue, and

3. Y in each instance is selected from the group consisting of cyclic monovalent nitrogen containing organic radicals and residua and monovalent organic radicals and residua having the general formula

wherein $R_1$ is a divalent organic radical having a linear carbon chain length of about 1–7 carbon atoms and $R_2$ and $R_3$ are selected from the group consisting of —H,—OH,—SH, halogen and monovalent organic radicals and residua having a linear carbon chain length of about 1–7 carbon atoms,

and subjecting the said warm blooded animal to an environment wherein it is required to learn tasks or memorize information.

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## 3,965,263
## CHOLINE SALICYLATE COMPOSITIONS AND METHODS FOR ACHIEVING ANALGESIA

Walter Thomas Swimm, Darien, Conn., assignor to The Purdue Frederick Company, Norwalk, Conn.

Division of Ser. No. 401,771, Sept. 28, 1973, Pat. No. 3,898,532, which is a division of Ser. No. 303,920, Nov. 6, 1972, Pat. No. 3,801,613. This application May 12, 1975, Ser. No. 576,926
Int. Cl.² A61K *31/695*
U.S. Cl. 424—184 8 Claims

1. The method of achieving analgesia in an animal or a human comprising administering to said animal or human a therapeutically sufficient quantity of choline salicylate trimethylsilylsilicon dioxide.

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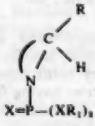
## 3,965,264
## PROCESS FOR CONTROLLING MICROBIOLOGICAL ORGANISMS IN AQUEOUS OR PETROLEUM HYDROCARBON SYSTEMS

Derek Redmore, Ballwin, Mo., assignor to Petrolite Corporation, St. Louis, Mo.

Division of Ser. No. 210,106, Dec. 20, 1971, Pat. No. 3,821,232. This application Mar. 19, 1974, Ser. No. 452,644
Int. Cl.² A01N *9/36*
U.S. Cl. 424—200 12 Claims

1. A process of inhibiting the growth of bacteria, fungi, algae and protozoa in an aqueous or petroleum hydrocarbon system which comprises adding to said system an effective amount of a Diels-Alder Adduct of (1) a dihydro-nitrogen phosphoramidate of the formula



where N — C

represents a nitrogen heterocyclic group, R and $R_1$ are lower alkyl or phenyl and X is O or S, and (2) a dienophile selected from the group consisting of unsaturated acids, alpha, beta-unsaturated carbonyl compounds, acetylenic compounds and cyclic ketones.

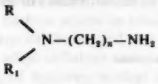
3,965,265

## ANTIMICROBIAL AGENTS FOR WATER CONSERVATION

Günter Koppensteiner, Hilden, Rhineland; Hans-Werner Eckert, Dusseldorf, and Volker Wehle, Hilden, Rhineland, all of Germany, assignors to Henkel & Cie G.m.b.H., Dusseldorf, Germany

Division of Ser. No. 352,941, April 20, 1973, Pat. No. 3,874,869. This application Jan. 20, 1975, Ser. No. 542,229
Claims priority, application Germany, Apr. 24, 1972, 2220026; Mar. 22, 1973, 2314221
Int. Cl.² A01N 9/36
U.S. Cl. 424—204 32 Claims

1. A process for the prevention of the growth of microorganisms selected from the group consisting of gram-positive bacteria, gram-negative bacteria, and fungi which consists essentially of contacting said microorganisms with an amount effective to prevent the growth of said microorganisms of a reaction product of ϵ-caprolactam with a N-alkylalkylenediamine of the formula



wherein R is selected from the group consisting of alkyl of 10 to 18 carbon atoms, hydroxyalkyl of 10 to 18 carbon atoms, alkenyl of 10 to 18 carbon atoms, hydroxyalkenyl of 10 to 18 carbon atoms, alkadienyl of 10 to 18 carbon atoms, alkatrienyl of 10 to 18 carbon atoms, and mixtures of alkyl derived from fatty acid mixtures of 10 to 18 carbon atoms, $R_1$ is a member selected from the group consisting of hydrogen and alkyl of 1 to 4 carbon atoms, and n is an integer from 2 to 6, with the molar ratio of N-alkylalkylenediamine to ϵ-caprolactam ranging from 1:1 to 1:10 and said reaction being carried out for 3 to 20 hours in the liquid phase at a temperature above 180°C.

3,965,266

## METHYL ROSANILINE CHLORIDE ADDITIVE FOR PREVENTION OF FUNGI AND MOLDS IN POULTRY AND ANIMAL FEEDSTUFFS

Dennis E. Jackson, Springfield, Mo., assignor to Maremco, Inc., Springfield, Mo.

Continuation of Ser. No. 307,372, Nov. 17, 1972, abandoned. This application Jan. 6, 1975, Ser. No. 538,905
Int. Cl.² A23K 3/00
U.S. Cl. 426—97 6 Claims

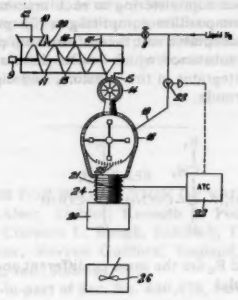
1. A substantially dry, finely-divided, solid additive for inhibiting or preventing microbial activity, fungi and mold growths in animal and poultry feeds comprising a finely-divided, non-toxic, mineral carrier having from about 0.05% to 5.0% by weight of methyl rosaniline chloride dispersed thereon, said mineral carrier having incorporated therein by adsorption or reaction from about 0.1% to 10% by weight of a non-toxic acid based on the weight of the carrier, said acid being one which is adsorbed by or forms water soluble reaction products with said carrier, to thereby facilitate the release of said methyl rosaniline chloride from the carrier in the presence of moisture.

3,965,267

## CRYOPULVERIZING AND POST-TREATMENT OF FLAVORING MATERIALS

Robert Bruce Davis, Nyack, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Filed Sept. 17, 1974, Ser. No. 506,863
Int. Cl.² A23L 3/36; B02C 21/00
U.S. Cl. 426—273 4 Claims




1. A process for comminuting a flavoring material selected from the group consisting of spices, coffee and cocoa to a powder finer than 70 mesh which is readily dispersible in aqueous solution comprising the steps of:

1. feeding the flavoring material to be comminuted into a grinding zone,
2. introducing a cryogenic refrigerant into said grinding zone in sufficient quantity to maintain said flavoring material at a cryogenic temperature,
3. pulverizing said flavoring material in said grinding zone to form a powder finer than 70 mesh,
4. separating said powder from the vaporized cryogenic refrigerant and collecting same, and
5. agitating said powder at a temperature above −100°F but below the deteriaration temperature of the flavoring material until a sufficient quantity of the oil content of the flavoring material is released from the powder to coat its surface where said agitation is for a time sufficient to produce a powder capable of forming an aqueous dispersion substantially free of agglomerated particles of said flavoring material.

3,965,268

## EXPANDED PROTEIN PRODUCT COMPRISING SULFUR-CONTAINING ORGANIC COMPOUND

Charles T. Stocker, Augusta; Robert E. Schara, Battle Creek, both of Mich.; William E. Marshall, Mount Kisco, N.Y.; John T. Hayes, Jr., North Tarrytown, N.Y., and Martin Glicksman, Valley Cottage, N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Continuation of Ser. No. 244,996, April 17, 1972, abandoned, which is a continuation of Ser. No. 876,081, Nov. 12, 1969, abandoned. This application Mar. 1, 1974, Ser. No. 447,172
Int. Cl.² A23J 1/02, 1/12, 1/14
U.S. Cl. 426—331 10 Claims

1. A method of preparing an expanded, edible protein product having an open, cellular structure comprising forming an admixture of proteinaceous material having a protein content of at least about 30% by weight, from about 0.05% to about 2.0% by weight of said proteinaceous material of a sulphur-containing organic compound selected from the group consisting of cysteine hydrochloride, D,L-methionine, sodium lignosulfonate, thiamine mononitrate, calcium thioglycollate and mixtures thereof, and water in an amount sufficient to result in a moisture content of 15 to about 50% by weight of said admixture; heating the mix to a temperature above about

220°F, mechanically working the heated mix at a pressure substantially above atmospheric pressure; and expanding the mix by suddenly releasing the pressure.

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3,965,269

## METHOD OF EXTRACTING ROASTED COFFEE

**William F. Lee, Dollard des Ormeaux; William J. Jeffery, Chateauguay Centre; Richard R. Pyves, and Moshi Y. Isaac, both of Montreal, all of Canada, assignors to General Foods Limited, Toronto, Canada**

**Filed Dec. 11, 1972, Ser. No. 313,726**
**Claims priority, application Canada, Nov. 2, 1972, 155431**
**Int. Cl.² A23F *1/08***
**U.S. Cl. 426—387** **11 Claims**

1. A process for producing coffee extract by split-extraction percolation of roasted and ground coffee wherein a percolator set is divided into an atmospheric section and an autoclave section, comprising

a. extracting soluble coffee solids from roasted and ground coffee in said autoclave section by passing an aqueous autoclave extraction liquid through said autoclave section;

b. drawing off a pre-determined quantity of autoclave coffee extract from the fresh stage of said autoclave section;

c. splitting said autoclave coffee extract into a product portion and a feed portion;

d. passing the feed portion of said autoclave extract through said atmospheric section to extract soluble coffee solids from the roasted and ground coffee in said atmospheric section;

e. drawing off a pre-determined quantity of atmospheric coffee extract product from the fresh stage of said atmospheric section; and

f. further processing said atmospheric coffee extract and said product portion of said autoclave coffee extract to obtain a dry instant coffee product.

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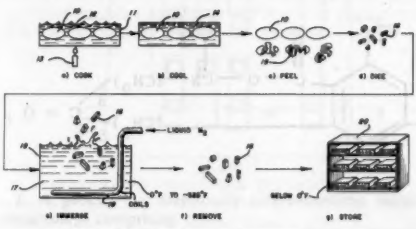
3,965,270

## METHOD OF FREEZING COOKED EGGS

**Jacob J. Epstein, Topeka, Kans., assignor to Seymour Foods, Inc., Topeka, Kans.**

**Filed Aug. 12, 1974, Ser. No. 496,455**
**Int. Cl.² A23L *1/32*; C12C *3/04***
**U.S. Cl. 426—418** **9 Claims**




1. A method of freeze treating a shelled, cooked egg whereby said egg may be stored satisfactorily and upon thawing said has physical and chemical characteristics substantially unchanged from the freshly cooked condition of said egg said method comprising:

immersing and retaining said egg in a liquid bath, the temperature of which is maintained at from approximately 0°F to approximately −325°F, until said egg is frozen;

removing said frozen egg from said bath; and

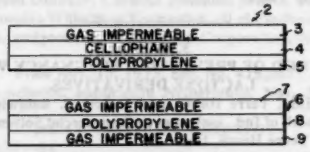
storing said frozen egg at temperatures below approximately 0°F.

3,965,271

## METHOD FOR PACKAGING CHEESE CURD

**Frank C. Harrington, Danville, Ill., assignor to Continental Can Company, Inc., New York, N.Y.**

**Filed Aug. 19, 1974, Ser. No. 498,483**
**Int. Cl.² A01J *25/13***
**U.S. Cl. 426—515** **8 Claims**




1. In a process for producing a cheese product wherein a cheese curd is extruded through a nozzle into a flexible tubular mold, permitted to solidify or knit, and then removed from the mold to form a cheese product, the improvement which comprises:

employing as said mold, a flexible tubular mold having (a) an outer film comprised of a laminate of a first film ply of cellophane having bonded to its outer surface a second film ply having a gas transmission rate of less than 10 cc/100 in.² /24 hour-atm. and a third film ply of biaxially oriented polypropylene bonded to the inner surface of the cellophane ply, and (*b*) an inner film comprised of a fourth film ply of biaxially oriented polypropylene.

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3,965,272

## METHOD OF FREEZE TREATING MAYONNAISE-CONTAINING PRODUCTS

**Jacob J. Epstein, and Lawrence R. York, both of Topeka, Kans., assignors to Seymour Foods, Inc., Topeka, Kans.**

**Continuation-in-part of Ser. No. 496,455, Aug. 12, 1974, Pat. No. 3,965,270. This application Aug. 18, 1975, Ser. No. 605,631**
**Int. Cl.² A23L *1/24*; A23B *4/06*, *5/04***
**U.S. Cl. 426—524** **11 Claims**

1. A method of freeze treating a mayonnaise-containing product whereby such product may be stored satisfactorily in a frozen condition and upon thawing will maintain physical and chemical characteristics substantially unchanged from its pre-frozen state, said method comprising:

immersing said product in a liquid bath of an inert liquid, said liquid maintained at a temperature of greater than approximately −50°F. but less than approximately 0°F.;

maintaining said product in said bath until said product is completely frozen;

removing said frozen product from said bath; and

storing said frozen product at temperatures greater than approximately −50°F. but less than approximately 0°F.

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3,965,273

## DRY CARBONATION SOURCE AND METHOD FOR PREPARING THE SAME, AND DRY CARBONATED BEVERAGE CONCENTRATE

**Howard D. Stahl, Hartsdale, N.Y., assignor to General Foods Corporation, White Plains, N.Y.**

**Filed Apr. 2, 1973, Ser. No. 347,107**
**Int. Cl.² A23L *1/22*, *2/02***
**U.S. Cl. 426—548** **15 Claims**

1. A dry carbonated beverage concentrate for preparing a carbonated beverage comprising:

a. a dry carbonation source which comprises a solid suspension of finely-divided calcium carbonate dispersed within a matrix of a water-soluble carbohydrate wherein the calcium carbonate has an average primary particle size of less than about 100 millimicrons and is substantially free from agregates in excess of about 10 microns,

b. a dry non-toxic acid, and
c. a flavorant.

**10.** A dry carbonated beverage concentrate according to claim 9 wherein the acid is present in an amount of from about 1 to 20% in excess of the amount theoretically required to release all of the carbon dioxide from the calcium carbonate and the supplemental carbonation source into solution upon solvation in water.

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**3,965,274**

## METHOD OF PREVENTING PREGNANCY WITH LACTONE DERIVATIVES

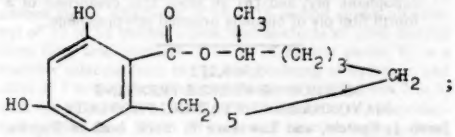
**Phil H. Hidy, Terre Haute, and Robert S. Baldwin, Montezuma, both of Ind., assignors to Commercial Solvents Corporation, Terre Haute, Ind.**

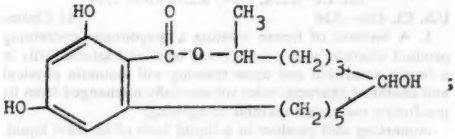
**Continuation of Ser. No. 273,439, July 20, 1972, abandoned, which is a continuation of Ser. No. 28,967, April 15, 1970, abandoned, which is a continuation-in-part of Ser. No. 512,111, Dec. 7, 1965, abandoned. This application June 7, 1974, Ser. No. 477,406**

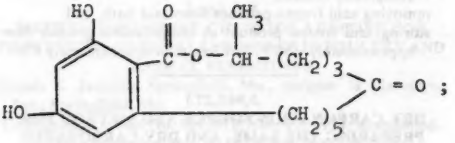
**Int. Cl.² A61K *31/365***

**U.S. Cl. 424—279** **10 Claims**

**1.** A method of preventing pregnancy in female humans experiencing a reproductive cycle which comprises administering to said female human in unit dosage form an effective amount to prevent pregnancy of a compound of the formula selected from the group consisting of:







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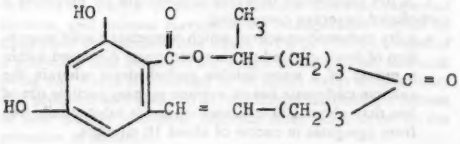


**3,965,275**

## COMPOSITION AND METHOD

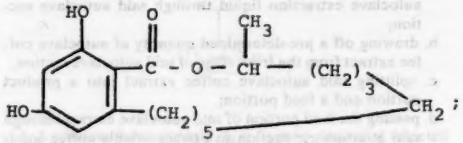
**Phil H. Hidy, Terre Haute, and Robert S. Baldwin, Montezuma, both of Ind., assignors to Commercial Solvents Corporation, Terre Haute, Ind.**

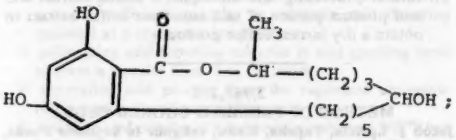
**Continuation of Ser. No. 441,150, Feb. 11, 1974, abandoned, which is a continuation of Ser. No. 289,456, Sept. 15, 1972, abandoned, which is a continuation of Ser. No. 28,913, April 15, 1970, abandoned, which is a continuation-in-part of Ser. No. 512,199, Dec. 7, 1965, abandoned. This application May 12, 1975, Ser. No. 576,639**

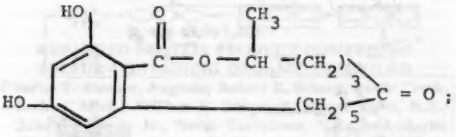
**Int. Cl.² A61K *31/365***

**U.S. Cl. 424—279** **5 Claims**

**1.** A method of treating post-menapausal syndrome in a human female having such syndrome which comprises internally administering to said human an amount sufficient to relieve said syndrome of a compound of the formula selected from the group consisting of:







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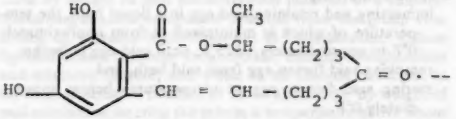
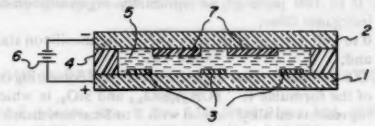


## 3,965,276
## POLYMERIZATION IMAGING

Paul J. Cressman, Fairport; William W. Limburg, Penfield, both of N.Y., and Louis A. Pilato, Bound Brook, N.J., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 248,770, April 28, 1972, Pat. No. 3,879,275, which is a continuation of Ser. No. 858,062, Sept. 15, 1969, abandoned. This application Jan. 7, 1975, Ser. No. 539,147
Int. Cl.² G03G 17/00
U.S. Cl. 427—12 8 Claims

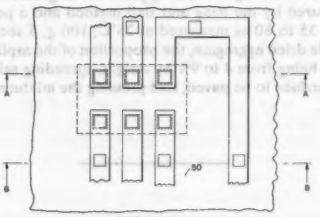



1. The method of forming an image comprising:
a. providing, between and in contact with at least two electrodes, one of said electrodes being in imagewise configuration, a liquid, polymerizable composition comprising unsaturated vinyl containing compounds capable of undergoing liquid to solid addition polymerization in response to application of an electrical field across said polymerizable composition; and
b. in the absence of chemical initiators, catalysts and electrolytes, applying an imagewise configured electrical field across said polymerizable composition to polymerize said composition until an image is formed.

## 3,965,277
## PHOTOFORMED PLATED INTERCONNECTION OF EMBEDDED INTEGRATED CIRCUIT CHIPS

Elis A. Guditz, and Robert L. Burke, both of Lexington, Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation-in-part of Ser. No. 251,754, May 9, 1972, abandoned. This application Feb. 28, 1974, Ser. No. 446,865
Int. Cl.² B05D 1/24, 1/38
U.S. Cl. 427—43 14 Claims




1. A process for electrically interconnecting integrated circuit chips comprising,
embedding said chips in cured resin to form a planar array of chips whose pads are not covered by the cured resin,
depositing photosensitized liquid resin on the pad-side of said array and curing said resin by photo exposure through a mask to form a via layer, said via layer having vias in registration with the chip pads,
depositing liquid resin on said via layer and curing said resin by photo exposure through a mask to form a conductor-groove layer, said conductor-groove layer containing both continuous and isolated grooves some of which are aligned through said vias to said pads,
chemically depositing an electrically conductive material only in the grooves and vias to form both continuous and isolated conductors in the conductor-groove layer some of which are electrically connected to the chip pads through the vias.

## 3,965,278
## METHOD OF MAKING SCREENS FOR CATHODE-RAY TUBES

Hans Dignus Duinker; Cornelis Johannes Schoot, and Gerardus Antonius Wilhelmus Vermeulen, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

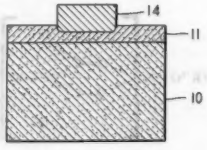
Filed Nov. 13, 1973, Ser. No. 415,367
Claims priority, application Netherlands, Nov. 30, 1972, 7216227
Int. Cl.² B05D 3/06; H01J 29/32
U.S. Cl. 427—54 5 Claims

1. A method of providing a screen on a cathode-ray tube suitable for the application of phosphor materials, said method comprising forming a light-hardenable photosensitive layer of polyvinyl alcohol and a light-sensitive hexavalent chromium compound on a face plate of said tube, forming a layer of polyvinyl alcohol and a light-sensitive substance capable of absorbing light and which upon exposure to light decomposes into decomposition products which substantially do not absorb said light on said light hardenable photosensitive layer, locally exposing said thus coated face plate to light through a mask to locally harden desired areas of said light hardenable layer, dissolving out by means of a suitable solvent the light sensitive compound and the decomposition products thereof, developing the latent image produced by exposure to light of the polyvinyl alcohol-chromium compound layer, drying said developed image, thereby producing a layer of sharply defined hardened portions of polyvinyl alcohol on said face plate, applying a non-reflective layer to said face plate and then etching away the hardened polyvinyl alcohol portions and the portions of the non-reflective layer superimposed thereon thereby leaving sharply defined uncoated portions of the face plate separated from each other by the non-reflective layer and suitable for coating by phosphors.

## 3,965,279
## OHMIC CONTACTS FOR GROUP III-V n-TYPE SEMICONDUCTORS

Hyman Joseph Levinstein, Berkeley Heights, and Ashok Kumar Sinha, Murray Hill, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sept. 3, 1974, Ser. No. 502,451
Int. Cl.² B05B 5/12
U.S. Cl. 427—89 15 Claims




1. A method of forming an ohmic contact on a III-V n-type semiconductor material comprising the steps of forming a metal film on the surface of the semiconductor comprising a first layer comprising germanium and a second layer comprising palladium over the first layer, and heating the resulting structure at a temperature and for a time sufficient to react said metal film with said semiconductor without melting said metal film so that an ohmic contact is formed at the semiconductor surface, the relative thicknesses of the two layers being such that during the heating the second layer diffuses through the first layer to the semiconductor.

3,965,280

## USE OF ORGANOPOLYSILOXANE COMPOSITIONS WHICH CURE AT AMBIENT TEMPERATURE IN COATING ELECTRICAL AND ELECTRONIC DEVICES

Louis Ceyzeriat, Lyon, and Michel Letoffe, Ste.-Fay-les-Lyon, both of France, assignors to Rhone-Poulenc S.A., Paris, France

Division of Ser. No. 447,501, March 4, 1974, Pat. No. 3,922,246. This application May 5, 1975, Ser. No. 574,394
Claims priority, application France, Mar. 7, 1973, 73.08143
Int. Cl.[2] B05D 5/12
U.S. Cl. 427—126 6 Claims

1. A process for coating an electric or electronic device which comprises applying to the device an organopolysiloxane composition which consists essentially of a mixture of the following ingredients, by weight:

i. 100 parts of a $\alpha,\omega$-dihydroxydiorganopolysiloxane polymer, of viscosity at least about 600 19 cPo at 25°C, consisting essentially of diorganosiloxy units, the organic radicals bonded to the silicon atoms being selected from alkyl radicals with 1 to 3 carbon atoms, halogenoalkyl radicals with 3 or 4 carbon atoms, the vinyl radical, aryl or halogenoaryl radicals with 6 to 8 carbon atoms or cyanoalkyl radicals with 3 or 4 carbon atoms, with the proviso that at least 50 % of these organic radicals are methyl radicals;

ii. 1 to 15 parts of an organosilicon compound which is either:

a. a monomer of the formula (A): $R_xSi[(OCH_2CH_2)_bOR']_{4-x}$, in which R represents a hydrocarbon radical with 1 to 8 carbon atoms, R′ represents an alkyl radical with 1 to 4 carbon atoms, and x and a independently represent zero or 1, or

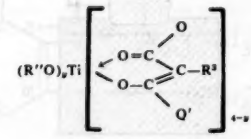
b. a polymer resulting from the partial hydrolysis of at least one monomer of formula $Si(OR')_4$, in which R′ is as defined above;

iii. 0.2 to 6 parts of an organic derivative of titanium, which is either:

a. a monomer of the formula (B): $Ti[(OCH_2CH_2)_bOR'']_4$, in which R″ represents an alkyl radical with 1 to 10 carbon atoms and b represents zero, 1 or 2 ; such that when b is zero, the alkyl radical has 3 to 10 carbon atoms and when b is 1 or 2 , the alkyl radical has 1 to 4 carbon atoms,

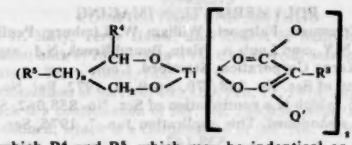
b. a polymer resulting from the partial hydrolysis of at least one monomer of the formula $Ti(OR'')_4$, in which R″ represents an alkyl radical with 3 to 10 carbon atoms,

c. a titanium chelate of the formula (C):



in which Q represents an alkyl radical with 1 to 4 carbon atoms, a phenyl radical or an alkoxy radical with 1 to 3 carbon atoms; R″ represents an alkyl radical of 3 to 10 carbon atoms; y represents 2 or 3 : $R^3$ represents a hydrogen atom, a methyl radical or a chloromethyl radical; Q′ represents an alkyl radical with 1 to 5 carbon atoms or a chloromethyl radical; or $R^3$ and Q′, together with the two carbon atoms to which they are attached, together form a phenyl nucleus, in which case Q represents an alkoxy radical or a hydrogen atom, or

d. a titanium chelate of the formula (D):



in which $R^4$ and $R^5$, which may be indentical or different, represent hydrogen atoms or methyl radicals; Q, Q′ and $R^3$ are as defined above and n represents zero or 1;

iv. 0 to 100 parts of an optionally organosilicon-treated inorganic filler;

v. 0 to 100 parts of plasticiser and/or organosilicon stabiliser and;

vi. 0.5 to 8 parts of an organosilicon resin consisting of units of the formulae $R'''(CH_3)_2SiO_{0.5}$ and $SiO_2$, in which R‴ represents an alkyl radical with 1 to 3 carbon atoms or the vinyl radical and the ratio of the number of $R'''(CH_3)_2Si$-$O_{0.5}$ units to the number of $SiO_2$ units is from about 0.411 to about 1.2/1, and curing the composition on the device.

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3,965,281

## METHOD FOR PAVING SURFACES WITH GRANULAR, FLAKY OR POWDERY ASPHALT

Takashi Takase, Narashino; Tsunekazu Hayashi, Mitaka, and Hirokazu Saitoh, Ohmiya, all of Japan, assignors to Mitsuboshi-Sangyo Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 151,571, June 9, 1971, Pat. No. 3,783,000. This application Sept. 20, 1973, Ser. No. 399,135
Claims priority, application Japan, June 11, 1970, 45-49845; June 11, 1970, 45-49846; June 11, 1970, 45-49847
Int. Cl.[2] E01C 5/12; B05D 5/10
U.S. Cl. 427—139 6 Claims

1. A method for paving surfaces with asphalt which comprises forming a mixture consisting of (1) powdery or granular asphalt having a diameter of from about 0.074 to about 10 mm or flaky asphalt having a thickness of from about 0.3 to about 0.5 mm and a width and length of from about 2 to about 4mm, said asphalts having a softening point of not greater than 95°C as measured by the Ring and Ball method and a penetration of from 35 to 80 as measured at 25°C, 100 g, 5 sec., and (2) a suitable dried aggregate, the proportion of the asphalt in said mixture being from 4 to 9% by weight, spreading said mixture on the surface to be paved, and pressing the mixture onto said surface.

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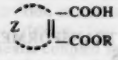
3,965,282

## THERMOGRAPHIC RECORDING MATERIAL

Wilhelmus Janssens, Aarschot; Daniel Alois Claeys; Raymond Gerard Lemahieu, both of Mortsel, and Jozef Aime Dierckx, Hove, all of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Division of Ser. No. 428,781, Dec. 27, 1973, Pat. No. 3,911,171. This application Apr. 29, 1975, Ser. No. 572,669
Claims priority, application United Kingdom, Sept. 14, 1973, 43336/73; Nov. 30, 1973, 55687/73
Int. Cl.[2] B32B 5/00
U.S. Cl. 428—341 16 Claims

1. A transfer sheet suitable for marking coloured images by a process involving heat-induced transfer of a compound with acid reaction to a receptor sheet incorporating a dye precursor compound, said transfer sheet incorporating as compound with acid reaction a compound corresponding to the following general formula:




wherein:

Z represents the necessary atoms to close an unsubstituted benzene nucleus, a halogen-substituted benzene nucleus or a nitro-substituted benzene nucleus, and

R represents an unsubstituted aliphatic group containing at least 4 carbon atoms, cycloaliphatic group or an aliphatic group substituted with hydroxyl, with an etherified hydroxyl group or with an acyloxy group.

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**3,965,283**

## FIBROUS SORBING MATERIALS AND PREPARATIONS THEREOF

**Willard S. Moore, Rte. 1, Box 118, West River, Md. 20881**

**Filed Dec. 18, 1974, Ser. No. 534,007**
**Int. Cl.² D02G** *3/00, 3/44*
**U.S. Cl. 428—378** **4 Claims**

1. A method of preparing a manganese oxide coated acrylic fiber which comprises:

immersing acrylic fiber in a solution of an alkali metal base at a concentration from about 4N to about 7N at a temperature from about 80°C to about 110°C until the fiber obtains an orange-red color;

removing said fiber from said solution;

removing excess solution from said fiber;

immersing said fiber in a solution of a $Mn^{+2}$ with a pH from 1 to 2 at a concentration from about 60% to 100% saturation at a temperature from about 30°C to about 40°C until the fiber is saturated;

removing said fiber from said solution;

removing excess solution from said fiber;

immersing said fiber in a solution of an alkali metal base at a concentration from about 3N to about 7N at a temperature from about 20°C to about 70°C;

removing said fiber from solution;

removing excess solution from said fiber; and

exposing said fiber to air until a blackish color is obtained.

**3,965,284**

## CHEMICALLY OPENING CHRYSOTILE ASBESTOS AND ENCAPSULATING

**Marinos Xanthos, and Raymond T. Woodhams, both of Toronto, Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada**

**Filed Jan. 19, 1973, Ser. No. 325,149**
**Claims priority, application Canada, Jan. 27, 1972, 133336**
**Int. Cl.² B32B** *17/00*
**U.S. Cl. 428—404** **13 Claims**

1. A method of chemically opening chrysotile asbestos into individual fibrils and at least partially encapsulating with polymer comprising:

a. physically breaking up the asbestos and shredding the fibres to a preliminary stage,

b. dispersing the resulting asbestos shreds in an aqueous alkaline medium of alkaline pH up to about 10 containing a soluble vinylic polymer polyelectrolyte having free carboxylic acid groups, with agitation to chemically open and coat the individual asbestos fibrils, and

c. insolubilizing the polyelectrolyte on the fibrils, and separating coated fibrils from the aqueous medium.

3,965,285

## ELECTRICALLY CONDUCTIVE OBJECT HAVING AN ABLATIVE LAYER THEREON FOR PROTECTING THE SAME FROM DAMAGE BY AN ELECTRICAL DISCHARGE

Robert Dickson Hill, P.O. Box 5484, Montecito, Calif. 93108

Filed July 8, 1974, Ser. No. 486,665

Int. Cl.² H05F *1/02*; H02G *13/00*; B64D *45/02*

U.S. Cl. 174—2 1 Claim

1. The electrically conductive object having an ablative layer for protecting the surface of said conductive object from damage by an electrical discharge, the said object being required to have no particular shape or mechanical form other than to have an electrically conductive surface or be a particular part or parts of an electrically conductive surface, said surface, part or parts of surface being potentially vulnerable to damage when located in an environment that may be subject to electrical breakdown or discharge, the said layer covering the surface of the conductive object or covering said part or parts of the surface of the conductive object potentially exposed, the said layer having a specific physical and solid-state structure, comprising: a continuous, anisotropic, polycrystalline layer of hexagonal graphite crystals, the said crystals being densely aggregated together so as to constitute a continuous layer of high electrical and thermal conductivities, the said crystals being strongly bonded to the underlying surface of the conductive object, the said ablative layer having a thickness perpendicular to the surface of the conductive object of between approximately one and two millimeters, and the said crystals having their basal planes substantially parallel to the surface of the conductive object.

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3,965,286

## SPACER-DAMPER FOR OVERHEAD POWER TRANSMISSION LINES

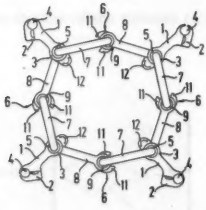
Thomas John Smart, Oadby, England, assignor to Dunlop Limited, London, England

Filed Apr. 15, 1975, Ser. No. 568,318

Claims priority, application United Kingdom, Apr. 18, 1974, 16962/74

Int. Cl.² H02G *7/14*, *7/12*

U.S. Cl. 174—42 7 Claims



1. A spacer-damper for a sub-conductor bundle of at least four sub-conductors of an overhead power transmission line, comprising: an arm for each sub-conductor, each arm having at one end a clamp having a groove for engaging the sub-conductor and at the other end a first resilient pivotal connection; and a central ring of at least eight rigid levers connected in series by second resilient pivotal connections, the first resilient pivotal connection at said other end of each arm connecting said arm to the central ring such that at least three resilient pivotal connections are in series between each adjacent pair or arms and all said pivotal resilient connections have their axes parallel to the axes of the grooves in the clamps.

3,965,287

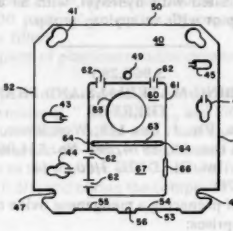
## ELECTRIC CIRCUIT ENCLOSURE TRANSFORMER MOUNTING MEANS

Dale A. Mueller, St. Paul, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Feb. 24, 1975, Ser. No. 552,099

Int. Cl.² H05K *5/03*

U.S. Cl. 174—66 5 Claims



1. Mounting means adapted to mount a transformer on an electric circuit enclosure, including: plate-like cover means for covering said enclosure to effectively contain and protect electric wiring within said enclosure; said plate-like cover means having upset portion means forming knockout means removable to form an opening in said cover means adapted to receive a portion of said transformer to aid in the mounting of said transformer on said cover means; said upset portion means having an open slot with two opposed and spaced surfaces that substantially divides said knockout means into two parts; said two parts being joined together by bridging portions; said knockout means conforming in shape to the shape of the transformer to be mounted thereon to allow said transformer to be partially recessed into said enclosure; and said knockout means further including an annular portion within said knockout means to provide an annular aperture for surface mounting of said transformer if said knockout means is not removed in its entirety from said cover means.

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3,965,288

## AUTOMATIC TUNING APPARATUS

Yasuhiro Yamada, Neyagawa; Kazuyoski Tsukamoto, Hirakata; Yoshiaki Sakauchi, Nara; Takashi Tamura, Sakai, and Yukio Saito, Higashiosaka, all of Japan, assignors to Sanyo Electric Co., Ltd., Japan

Filed Jan. 25, 1974, Ser. No. 436,536

Claims priority, application Japan, June 8, 1973, 48-64943; June 8, 1973, 48-64944; June 8, 1973, 48-64945

Int. Cl.² H04N *5/60*; H04B *1/32*; H03J *1/02*; H04B *3/04*

U.S. Cl. 178—5.8 A 30 Claims

1. An automatic tuning apparatus comprising:

a solid state electrochemical potential memory device comprising:

a cathode including an active metal,

an anode comprising an alloy including said metal, and

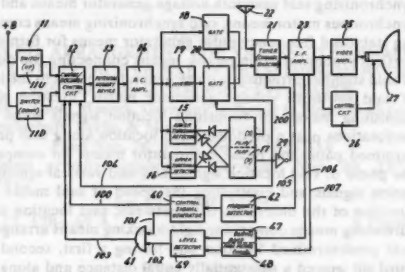
a solid state electrolyte having high ion conductivity sandwiched between said cathode and said anode, said potential memory device exhibiting a terminal voltage betweeen said anode and said cathode linearly changing as a functionn of the charging or discharging quantity of electricity supplied to said device by a flow of current therethrough selectively in a charging or discharging direction, respectively, tuning means comprising a voltage controlled variable reactance device and means responsive to said terminal voltage of said potential memory device for generating a control voltage and supplying said generated control voltage to said device, whereby the tuning frequency of said tuning

means is controlled by said control voltage as a function of said terminal voltage of said potential memory device,

means coupled to said tuning means for providing a signal indicative of the degree of tuning of said tuning means,

first means coupled to said means for providing said tuning degree indicating signal for threshold detecting said tuning degree indicating signal at a predetermined threshold level and producing a threshold detected output signal,

second means coupled to said tuning means for providing an output signal indicative of the realtionship of the tuning frequency of said tuning means with respect to a predetermined frequency, means responsive to said output from said second means for providing first and second correction signal outputs for respectively increasing and



decreasing the tuning frequency of said tuning means to correct for a difference thereof with respect to said predetermined frequency, and producing a third output signal when said tuning frequency has a predetermined relationship to said predetermined frequency,

means responsive to simultaneous outputs from said first means and said frequency correcting signal providing means for providing an output which is a logical product of said output signal from said first means and said third output signal of said frequency correcting signal providing means,

means for selectively producing first and second tuning direction selection output signals for selectively increasing and decreasing the tuning frequency of said tuning means,

means for selectively supplying a flow of current through said potential memory device, including:

means responsive selectively to said first and second output signals of each of said tuning direction selection output signal means and said correction output signal providing means to control the flow of current to said potential memory device in the corresponding one of said opposite directions for increasing and decreasing, respectively, the tuning frequency of said tuning means, and

switching means connected in series with said potential memory device, said switching means being rendered non-conductive in response to the presence of said logical product output signal to prevent a flow of current through said potential memory device, and being rendered conductive in response to either of said first and second tuning direction selection output signals or the absence of said logical product signal to permit a flow of current through said potential memory device.

**3,965,289**

## IMAGE REPRODUCING METHOD

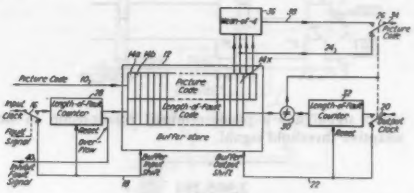
**Peter C. Pugsley, Pinner, England, assignor to Crosfield Electronics Limited, London, England**

**Filed June 30, 1975, Ser. No. 591,959**

**Claims priority, application United Kingdom, July 1, 1974, 29113/74**

**Int. Cl.² H04N 1/38**

**U.S. Cl. 178—6** **7 Claims**



1. A method of image reproduction of the kind in which an original to be reproduced is scanned, element by element, by an analysing scanner to provide a train of electric signals representative of density values of successively scanned picture elements and in which the said train of signals is used to control the treatment of successively scanned elements of an output surface, whereby the output surface bears a reproduction of the said original, the method further comprising, for forming a retouched reproduction of the original, the steps of:

marking a defect on the original prior to scanning with the analysing scanner, the marking applied to the defect and the analysing scanner being such that signals from the scanner indicative of the defect marking are distinguishable from signals from the remainder of the original;

sensing the presence of a defect-indicating signal in the scanner output;

applying the electric signals derived from the analysing scanner to a correction generator and deriving therefrom a replacement signal for the defect-indicating signal as a function of the densities of picture elements in a strip or area within which the said defective picture element is located;

and under the control of the defect-indicating signal, substituting the said replacement signal for the electric signal corresponding to the defective picture element in the train of signals for controlling the output surface treatment.

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**3,965,290**

## VIDEO-TO-BINARY CONVERSION APPARATUS HAVING MOIRE SUPPRESSION CHARACTERISTICS

**James G. Tisue, Mountain View, Calif., assignor to Dacom, Inc., Santa Clara, Calif.**

**Filed Mar. 21, 1975, Ser. No. 560,825**

**Int. Cl.² H04N 1/40**

**U.S. Cl. 178—6** **22 Claims**

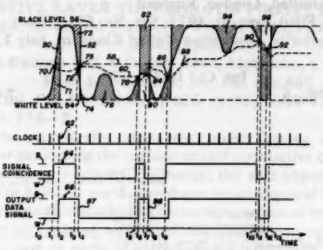
12. In an image reproduction system including means for scanning an image and developing a video signal commensurate therewith, signal conversion means for converting the video signal to a binary signal, and means for utilizing the binary signal to develop a reproduction of a scanned image, an improved signal conversion means having moire suppression characteristics comprising:

normalizer means for normalizing said binary signal relative to said video signal;

integrator means for integrating the difference between said video signal and the normalized binary signal to develop an adaptive threshold signal; and

comparator means for comparing said video signal to said

adaptive threshold signal to develop said binary signal, said binary signal changing binary states each time said




video signal has a predetermined relationship to said adaptive threshold signal.

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**3,965,291**

## METHOD AND ARRANGEMENT FOR SCANNING A SEQUENCE OF IMAGES

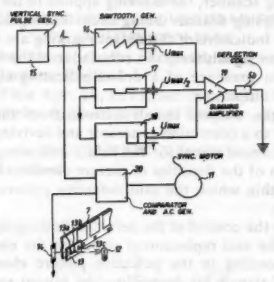
**Richard Wick, Munich; Friedrich Bestenreiner, Grunwald; Reinhold Deml, and Josef Helmberger, both of Munich, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany**

**Continuation of Ser. No. 162,373, July 14, 1971, abandoned. This application Aug. 1, 1973, Ser. No. 384,396**

**Claims priority, application Germany, July 18, 1970, 2035820**

**Int. Cl.³ H04N** *5/86*

**U.S. Cl. 178—7.2** **4 Claims**




1. Arrangement for scanning a motion picture film recorded at a determined frame rate for reproduction on a television receiver having a vertical scanning rate approximately equal to an integral multiple of said frame rate, said motion picture film having a sequence of images each having a predetermined height in the lengthwise direction of said motion picture film and a plurality of perforations having fixed locations relative to said images; synchronous motor means for moving said motion picture film continuously along a predetermined path in a predetermined first direction; scanning means for scanning each of said images a first, second and third time in a direction opposite to said first direction thereby furnishing scanning signals constituting a first, second and third scan, during said movement of said images along said predetermined path, said scanning means comprising a cathode ray tube furnishing a point source of a light beam and having a screen and a deflection coil, lens means for focusing an image of said screen onto each of said images as each of said images passes said scanning region, and photosensitive means arranged behind said motion picture film in the direction of said path of said light from said point source of said cathode ray tube, for furnishing said scaning signals in response to light impinging thereon, the height of said screen of said cathode ray tube exceeding the height of said image formed by said lens means on each of said images by a factor of one-third, said light beam covering a distance along said predetermined path in said direction opposite to said first direction of two-thirds of said image height during each of said scans; scan control means for displacing said scanning region by a predetermined distance corresponding to approximately one-third of said image height upon completion of said first and second scan, said scan control means comprising sawtooth voltage generator means for furnishing a sawtooth voltage having a determined maximum amplitude, first additional pulse generator means connected to said sawtooth voltage generator means and furnishing a negative pulse of one-half said maximum amplitude, second additional pulse generator means connected to said first additional pulse generator means for furnishing a negative pulse having an amplitude corresponding to said maximum amplitude, and summing amplifier means having a first, second and third input respectively connected to said sawtooth voltage generator means, and said first and second additional pulse generator means, and an output connected to said deflection coil; and synchronizing means for synchronizing said sawtooth voltage generator means and said synchronous motor means, said synchronizing means comprising stabilized frequency pulse generator means for furnishing vertical synchronization pulses, means connecting the output of said stabilized frequency pulse generator means to the input of said sawtooth voltage generator means, location signal furnishing means for furnishing location signals when said perforations pass a predetermined location along said predetermined path, and phase comparator means for comparing the phase of said location signals and said vertical synchronization signals and controlling the speed of said motor as a function of the difference therebetween, said location signal furnishing means comprising light blocking means arranged at said predetermined location and having a first, second and third slit spaced a substantially equal distance and along said height of said images, a source of illumination illluminating said first, second and third slits, and additional photosensitive means positioned behind said elongaged signal carrier means in direction of said light for furnishing said location signals when said perforations pass said slits.

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**3,965,292**

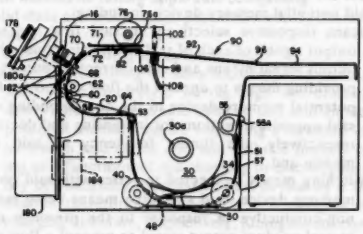
## PAPER HANDLING APPARATUS FOR FACSIMILE RECEIVER

**Matthew J. Costello, Bethel; Donald T. Dolan, Ridgefield; Andre T. Dehaudringhien, Stamford; Antoon M. Hurkmans, New Milford; Kenneth R. Jasinski, Danbury, and Edward G. Keplinger, Woodbury, all of Conn., assignors to Graphic Sciences, Inc., Danbury, Conn.**

**Division of Ser. No. 312,857, Dec. 7, 1972, Pat. No. 3,886,308. This application Feb. 21, 1975, Ser. No. 551,622**

**Int. Cl.³ H04L** *13/06*

**U.S. Cl. 178—42** **17 Claims**



14. Record paper handling apparatus comprising

a paper supply comprising a roll of paper on which a message is to be printed and which is to be cut into sheets carrying such messages,

means feeding said paper to a work station,
means for cutting said paper into sheets, and
a sheet-receiving station following said work station including a lower plate and an upper plate between which a sheet is fed, said upper plate having an aperture in which said sheet is exposed,
an extractor wheel disposed above said upper plate and positioned so that its surface can enter said aperture and it can engage and feed a sheet of paper present between said upper and lower plates, as it is rotated,
a sheet-receiving tray adjacent to said upper and lower plates
a paper-gripping means between a portion of said sheet-receiving tray and said lower plate,
a cam coupled to said extractor wheel and rotating said wheel, and means operated by said cam for moving said tray downwardly as said extractor wheel feeds a sheet of paper thereon and, after the sheet of paper falls onto said tray, moving said tray upwardly, with the end of the sheet of paper held between and gripped by said paper-gripping means.

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**3,965,293**

## CIRCUIT ARRANGEMENT FOR VARYING THE PHASE OF A REFERENCE SIGNAL IN TRANSMISSION PATH DISTORTION MEASURING APPARATUS

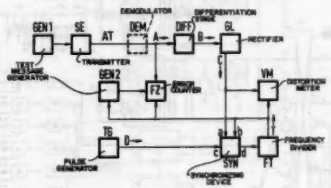
**Erwin Schenk, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany**

**Filed Nov. 20, 1974, Ser. No. 525,514**

**Claims priority, application Germany, Nov. 20, 1973, 2357912**

**Int. Cl.² H04L** *25/06*

**U.S. Cl. 178—69 A** **6 Claims**




1. In apparatus for determining the distortion on a data transmission path, a circuit arrangement for adjusting the phase of a reference signal produced from a timing signal in the receiver relative to a signal received over said data transmission path, comprising:
first storage means for producing an output signal responsive to lagging distortion,
second storage means for producing an output signal responsive to leading distortion,
counter means for operating responsive to said reference signal to count counting pulses and for producing a signal upon reaching a predetermined count value,
means for supplying counting pulses to said counter means responsive to the presence of said first storage means output signal,
third storage means for receiving said counter output signal and producing an output signal responsive thereto,
logic circuit means capable of assuming first and second states for producing a binary output signal, said logic circuit means being constructed to remain in its first state when said second storage output signal is absent or when said first, second and third storage output signals are present, said logic circuit means being constructed to switch from said first to said second state when said second storage output signal is present and said third storage output signal is absent and
means responsive to said logic circuit binary output signal for producing delay or lead in said reference signal.

**3,965,294**

## METHOD OF AND APPARATUS FOR TESTING TRANSMISSION LINE CARRYING BIPOLAR PCM SIGNALS

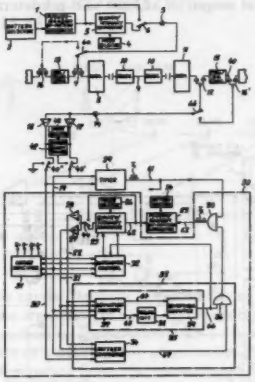
**Günter Renz, Eningen; Walter Wehr, Wannweil, and Bertram Amann, Eningen, all of Germany, assignors to Wandel U. Goltermann, Eningen, Germany**

**Filed Apr. 23, 1975, Ser. No. 570,774**

**Claims priority, application Germany, Apr. 23, 1974, 2419478**

**Int. Cl.² H04L** *25/06*

**U.S. Cl. 178—69 A** **10 Claims**



1. A method of checking the bit-distortion ratio of a transmission line carrying the bipolar equivalent of binary message signals consisting of marks and spaces transmitted at a constant bit rate, comprising the steps of:
generating, at a transmitting end of said line, a binary test pattern;
converting said binary test pattern into an equivalent ternary test pattern with translation of successive marks of the binary pattern into bipolar pulses of alternating polarity;
transmitting said ternary test pattern over the line;
generating, at a receiving end of said line, a binary reference pattern matching said test pattern;
separating, at said receiving end, the bipolar pulses of the incoming ternary pattern according to their polarity and deriving therefrom a first pair of binary pulse trains;
deriving from the marks of said reference pattern a local pulse sequence in step with the incoming bipolar pulses;
dividing said local pulse sequence into a second pair of binary pulse trains respectively duplicating related pulse trains of said first pair, upon accurate transmission of said ternary test pattern, according to the law of conversion used at the transmitting end; and
comparing corresponding pulse trains of said first and second pairs, bit by bit, to discover any disparity therebetween.

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**3,965,295**

## PROTECTIVE SYSTEM FOR STEREO LOUDSPEAKERS

**Ronald C. Evans, and Sidney A. Corderman, both of Binghamton, N.Y., assignors to McIntosh Laboratory, Inc., Binghamton, N.Y.**

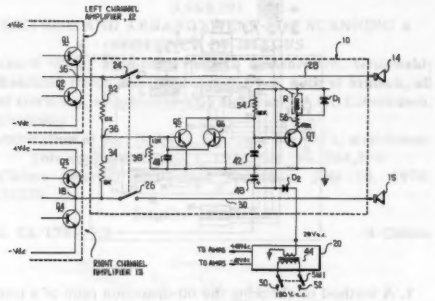
**Filed July 17, 1974, Ser. No. 489,407**

**Int. Cl.² H02H** *3/20, 7/20*

**U.S. Cl. 179—1 A** **9 Claims**

1. In an amplification system, an amplifier a load, normally open contacts connected in series between said amplifier and

said load, a rectifier power supply, a source of a.c. power, switch means for at will connecting said rectifier power supply to said source of a.c. power, said rectifier power supply having relatively long build-up and decay times of its output voltage responsive respectively to opening and closing of said switch means, means responsive to closing of said switch means for closing said normally open contacts with a time delay at least as great as said build-up time and for opening said contacts after only a relatively short time delay in response to opening of said switch means, wherein said amplifier has a substantially zero d.c. potential output during normal operation of said amplifier and a d.c. potential output of at least a predetermined level during an abnormal operating condition of said amplifier, said system further including means responsive to a d.c. potential output of at least said predetermined level for



opening said contacts, wherein said amplifier has an output terminal and wherein said last mentioned means includes an auxiliary power supply, one side of said auxiliary power supply being grounded, a relay coil for controlling said contacts, a semiconductor switch having a control terminal, means for connecting said relay coil and said semiconductor switch in series across said auxiliary power supply, first and second transistors having intercollectors connected to said control terminal, a voltage dividing network connected between the output terminal of said amplifier and ground, said voltage dividing network having a midpoint, means for connecting the midpoint of said voltage dividing network to the base of said first transistor and the emitter of said second transistor, means for connecting the base of said second transistor to ground, a capacitor, and means for connecting said capacitor between the base of said first transistor and ground.

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**3,965,296**

**SIGNALING SYSTEM**

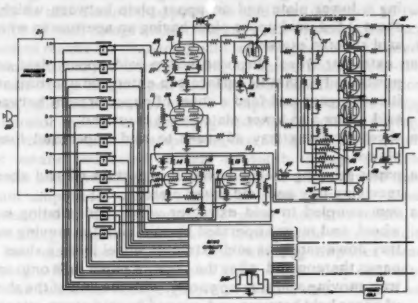
**Miller Ralph L., Chatham, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed June 30, 1944, Ser. No. 542,975**

**Int. Cl.² H04K *1/02***

**U.S. Cl. 179—1.5 R** **18 Claims**

**1.** In a signaling system, a plurality of input circuits carrying signal currents, a coresponding plurality of individual output channels, a privacy equipment common to said circuits and channels for rendering said signal currents unintelligible, a first set of relays for operatively associating said input circuits one at a time with said privacy equipment, a second set of relays for operatively associating said privacy equipment with



said channels one at a time, and a common timing circuit for operating the relays of each set in timed sequence.

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**3,965,297**

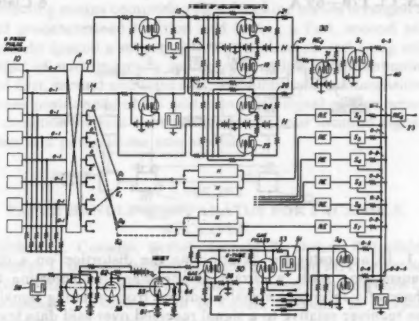
**SECRET COMMUNICATION SIGNAL GENERATING SYSTEM**

**Danforth K. Gannett, Mountain Lakes, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed May 1, 1946, Ser. No. 666,282**

**Int. Cl.² H04K *1/00*; H04L *9/04***

**U.S. Cl. 179—1.5 R** **6 Claims**



**1.** A key generating circuit for constructing a six-valued key by combination of signals of smaller ranges of values comprising means to produce two-valued signals of highly irregular occurrence, one signal having the values 0 and 1 unit, and the other having the values 0 and 3 units, means to produce a three-valued signal having the values 0 and 2 and 4 units occurring in irregular sequence, means to combine all of said signals in additive manner, and means effective when the summation signal has the value 6 units or a greater value for reducing such value by 6 units.

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**3,965,298**

**DEEP SEA DIVING SPEECH CONVERTER**

**James E. Carlson, Spring Valley, Calif., assignor to Long Enterprises, San Diego, Calif.**

**Filed May 5, 1975, Ser. No. 574,432**

**Int. Cl.² G11B *5/02***

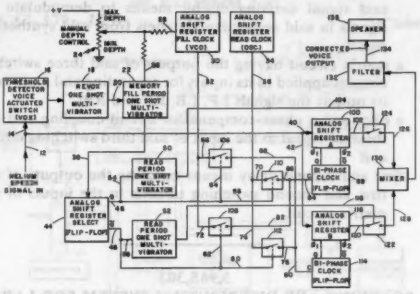
**U.S. Cl. 179—1 SH** **9 Claims**

**1.** A deep sea diving speech converter for converting a diver's speech made in a gas mixture at depth that has been increased in frequency of resonance from that of a normal frequency of resonance of a diver's voice in air and not at depth including,

an analog register,

first means for providing first clock signals at a rate proportional to the depth of the diver,

second means for providing second clock signals at a rate corresponding to normal voice signals,



means for feeding an analog electrical signal proportional to the speech made in the gas to said analog register at said first clock rate,

and means for reading out said analog electrical signal to a speaker at said second clock rate.

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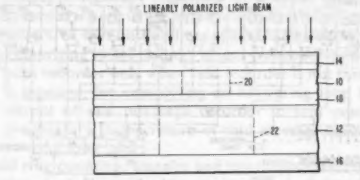
## 3,965,299
## DYNAMIC MAGNETIC BUBBLE DISPLAY SYSTEM

**Burn Jeng Lin, Shrub Oak, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed May 9, 1975, Ser. No. 575,909**
**Int. Cl.² H04N 5/66**
**U.S. Cl. 178—7.3 D** **16 Claims**




1. An optical processing and display device for producing multi-level phase images comprising:

a plurality of separate magnetic bubble array layers arranged in a stack, said magnetic bubble array layers being each of a different thickness, each of said magnetic bubble array layers being composed of material that supports magnetic bubble domains which are movable in predetermined paths in said array,

electrical signal means connected to each of said magnetic bubble array layers for selectively propagating magnetic bubble domains through said predetermined paths of said layers,

said magnetic bubble domains selectively propagated through said paths of said layers having dimensions proportional to and determined by the thickness of the layers in which they are propagated such that the bubble domains in the separate layers of bubble arrays in said stack are of different predetermined sizes,

a one-quarter wave plate layer disposed on one side of said stack of said magnetic bubble array layers,

and means for directing linearly polarized light through said one-quarter wave plate and said stack of bubble array layers, phase of the linearly polarized light directed through said stack of bubble array layers being modified a different amount by each layer of the bubble domains in each layer in accordance with the thickness of the bubble domains in each layer to produce a phase modified multi-level circularly polarized light image corresponding to said selectively propagated magnetic bubble domains.

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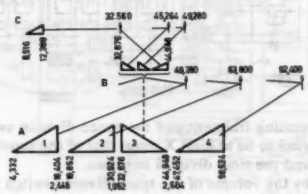
## 3,965,300
## 200 MHZ CARRIER FREQUENCY SYSTEM WITH SEXTENARY GROUPS

**Georg Märkl, Nurnberg, Germany, assignor to Tekade Felten & Guilleaume Fernmeldeanlagen GmbH, Nurnberg, Germany**

**Filed Apr. 23, 1974, Ser. No. 463,378**
**Int. Cl.² H04J 1/18**
**U.S. Cl. 179—15 FS** **2 Claims**




1. A 200-MHz carrier frequency method having a transmission band for the transmission of 32,400 speech channels by homospectral method in cooperation with a 60 MHz carrier frequency system of quinary group construction whose transmission band is separate from the transmission band of the 200 MHz method and is therefore no part thereof, in which method the 200 MHz transmission band comprises three sextanary groups, each containing four quinary groups, said method comprising allocating the 200-MHz transmission band such that the basic sextanary group is at the upper end of the 200-MHz transmission band and coincides with regard to its cut-off frequency as well as with regard to its internal structure with a 60 MHz transmission band which is directly translated into the frequency spectrum of the said basic sextanary group and contains the basic quinary group, forming the sextanary groups of the 200 MHz transmission band such that the frequency spacings between the sextanary groups are larger than the spacing between two side bands produced as a result of the said translation, suppressing the fringe zone of the second side band with only a partial attenuation value and transmitting the same together with the first side band which is used as a signal side band.

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## 3,965,301
## FOLDED SPACE-TIME-SPACE SWITCHING NETWORK

**Kevork Kevorkian, Saint-Germain-en-Laye, France, assignor to International Standard Electric Corporation, New York, N.Y.**

**Continuation of Ser. No. 436,610, Jan. 25, 1974, which is a continuation of Ser. No. 254,003, May 17, 1972. This application Sept. 9, 1974, Ser. No. 504,124**
**Claims priority, application France, June 14, 1971, 71.21457**
**Int. Cl.² H04Q 11/04**
**U.S. Cl. 179—15 AT** **4 Claims**

1. A folded space-time-space switching network for a PCM switching exchange, comprising

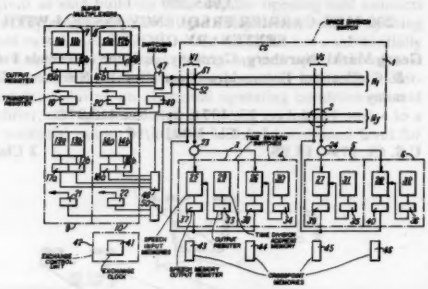
a space division switch including horizontals and verticals arranged to enable their interconnection through crosspoint switch means,

means coupling each horizontal to X supermultiplexers,

said supermultiplexers including means whereby each of a plurality of telephone lines can be coupled to an inlet terminal and to an outlet terminal of said space division

switch to enable the exchange of PCM signals between the horizontals and selected telephone lines, and

means coupling each vertical to X time division switches, said time division switches including means enabling the exchange of PCM signals between the verticals and the time division switches,



the operating frequency of the space-division switch being selected to be at least X times that of the supermultiplexers and the time division switches,

whereby the volume of the space division switch is minimal, as is the total volume of the combination of the space division switch and the time division switches.

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**3,965,302**

**STEREO SIGNAL DEMODULATOR IN A FOUR-CHANNEL STEREO BROADCAST RECEIVER**

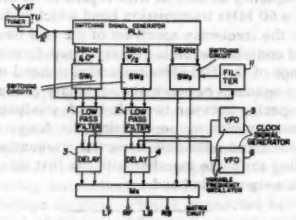
**Hirotaka Kurata, Tokyo, Japan, assignor to Sansui Electric Co., Ltd., Tokyo, Japan**

**Filed Jan. 28, 1975, Ser. No. 544,903**

**Claims priority, application Japan, Jan. 31, 1974, 49-13436**

**Int. Cl.[2] H04H 5/00**

**U.S. Cl. 179—15 BT** **31 Claims**



**25.** A stereo signal demodulator for a receiver in a four-channel stereo system in which four sound source signals (LF, LB, RF and RB) are transmitted from one station, the transmission being carried out for a synthesized signal comprising a signal in a main channel of (LF + LB) + (RF + RB), a pilot signal, a signal in a first sub-channel comprising a double side-band signal obtained by modulating an *m*-multiple frequency-multiplied signal of the pilot signal with a signal of (LF + LB) − (RF + RB), a signal in a second sub-channel comprising a double side-band signal obtained by moulating the same *m*-multiple frequency-multiplied but phase-shifted signal with a signal of (LF − LB) + (RF − RB), and a signal in a third sub-channel comprising a signal obtained by modulating an *n*-multiple ($m<n$) frequency-multiplied signal of the pilot signal with a signal of (LF − LB) − (RF − RB);

the four-channel stereo signal demodulator comprising:

signal deriving circuit means including means for deriving from the pilot signal in said synthesized signal that has been FM-detected by a tuner an *m*-multiple frequency-multiplied signal of said pilot signal, a signal obtained by phase-shifting said *m*-multiple frequency-multiplied signal, and an *n*-multiple frequency-multiplied signal of said pilot signal;

first, second and third switching circuits for switching their input signals comprised of said synthesized signal, respectively, under control of the respective three outputs of said signal deriving circuit means to demodulate the signals in said respective channels from said synthesized signal;

a matrix circuit having the outputs of said three switching circuits applied to its inputs for separating and emitting at its output the signals LF, LB, RF and RB;

a filter and a phase-compensator circuit coupling said synthesized signal to the input of said third switching circuit; and

first and second delay means coupling the outputs of said first and second switching circuits to the inputs of said matrix circuit.

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**3,965,303**

**SCANNING AND DISTRIBUTING SYSTEM FOR LARGE CENTRALLY CONTROLLED SWITCHING EXCHANGES**

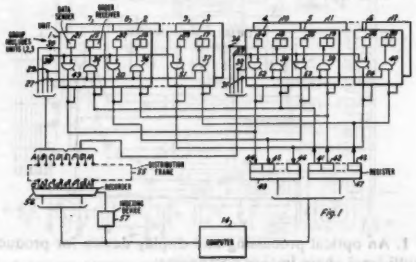
**Bernard Michel Henri Depouilly, and Christian Yves Tournier, both of Paris, France, assignors to International Standard Electric Corporation, New York, N.Y.**

**Continuation of Ser. No. 304,644, Nov. 8, 1972, abandoned. This application Aug. 26, 1974, Ser. No. 500,426**

**Claims priority, application France, Nov. 9, 1971, 71.40070**

**Int. Cl.[2] H04Q 3/54**

**U.S. Cl. 179—18 FG** **6 Claims**

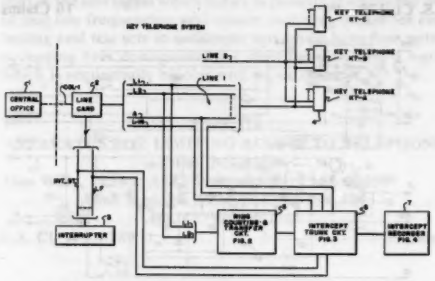


**1.** A scanning and distributing system for a centrally controlled telephone exchange to enable simultaneous supply of activation signals to a plurality of input points of devices in a number of switching units in an exchange from a single address specific to that plurality of points; comprising means coupled to receive signals from a computer and to route such signals to an exchange; said means including a plurality of code converters, a distribution frame and module decoders; a first one of said code converters being adaptable to receive signals representing logic addresses and to activate input terminals of said distribution frame in accordance with the logic addresses, said distribution frame responding to said signals representing logic addresses to provide output signals representing physical addresses corresponding to the locations of the pluralities of points within the exchange; and a second one of said code converters coupled to receive the output signals from said distribution frame and transmit them to respective module decoders; said module decoders routing signals to activate the plurality of input points in the switching units of the exchange.

## 3,965,304
## INTERCEPT ARRANGEMENT FOR KEY TELEPHONE SYSTEMS

Edward A. Marheine, Brookfield, Wis., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Dec. 10, 1974, Ser. No. 531,280
Int. Cl.² H04M 3/42
U.S. Cl. 179—18 B 7 Claims




1. For use in a key telephone system having a plurality of outside lines and having an intercept recorder provided in common for said outside lines;

a ring counting, transfer and intercept trunk circuit having terminations for individually connecting said circuit to a corresponding one of said outside lines and other terminations for connecting said circuit to said common intercept recorder; having first switching means effective after the receipt of a predetermined number of rings over said individual outside line for initiating extension of said line to said common intercept recorder; and second switching means controlled by said first switching means and in turn controlling said circuit so that one, and only one, complete message is returned to said outside line by said intercept recorder regardless of whether said intercept recorder is kept in use by calls incoming from another, or others, of said outside lines said second switching means comprising switchthrough means controlled by said intercept recorder only when said recorder is not transmitting a message, for completing an answering loop from the output of said intercept recorder to said outside line, preparatory to the return of said message over said answering loop; and

said ring counting, transfer and intercept trunk circuit further including a locking connection causing said first switching means to be held operated under the control of said switchthrough means; and switching elements controlled by said first switching means for closing an independent signalling circuit to key telephones included in said key telephone system; whereby signalling of said key telephone is continued irrespective of the termination of ringing current transmission over said outside line upon completion of said answering loop.

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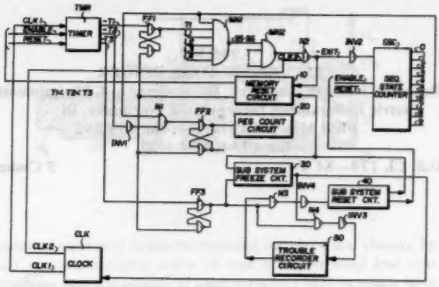
## 3,965,305
## ARRANGEMENT FOR INCREASING THE CALL HANDLING CAPABILITIES OF A CROSSPOINT TANDEM SYSTEM

John Ng, Elmhurst, and Melvin A. Jacobs, Hinsdale, both of Ill., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Dec. 30, 1974, Ser. No. 537,292
Int. Cl.² H04Q 3/42
U.S. Cl. 179—18 EB 10 Claims

1. A communication switching system including a plurality of incoming trunks, a plurality of register-senders, a switching network for connecting any one of said incoming trunks with any one of said register-senders, a register-sender access control circuit for establishing said connections, each of said connections being established during a cycle of said register-sender access control circuit and each cycle thereof being divided into a number of sequence states in each of which pre-established logical functions must be accomplished before said register-sender access control circuit can advance from one sequence state to another, and a sequence state counter for establishing said sequence states, the improvement comprising an arrangement for improving the call handling capability of said register-sender access control circuit, said arrangement comprising timer means for providing a plurality of time interval output signals including a first time interval output signal which is set for the minimum time interval in which all of the logical functions to be performed in a sequence state can be accomplished, reset means for resetting and enabling said timer means to provide said time interval




output signals associated with a sequence state, and first gating means, said first time interval output signal and signals indicating the completion of each of the logical functions to be completed in a sequence state being coupled to said first gating means, the receipt in coincidence of all of said signals enabling said first gating means, said first gating means upon being enabled providing an output signal which is coupled to and operates said sequence state counter to advance the sequence state to the next sequence state, whereby said register-sender access control circuit is permitted to complete a sequence state as the result of the accomplishment of all logical functions defined for that sequence state, and which is coupled to and operates said reset means to reset and enable said timer means.

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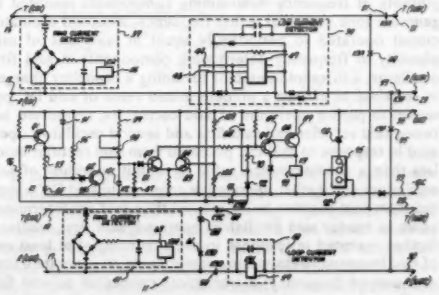
## 3,965,306
## TELEPHONE LINE TRANSFER CIRCUIT

Arthur Gene Watkins, Santa Ana, Calif., assignor to San/Bar Corporation, Santa Ana, Calif.

Filed Nov. 11, 1974, Ser. No. 522,866
Int. Cl.² H04M 3/54
U.S. Cl. 179—81 R 10 Claims



1. A telephone line transfer circuit for transferring a first pair of tip and ring lines, connected between a central office and a first subscriber set, to a second subscriber set, connected to a second pair of tip and ring lines from a central office, said line transfer circuit comprising:

first ring current detector means for detecting ringing current in said first pair of tip and ring lines;

second ring current detector means for detecting ringing current in said second pair of tip and ring lines;

loop current detector means for detecting loop current in said second pair of tip and ring lines;

means responsive to said first ring current detector means for, after a predetermined time delay, connecting said first pair of tip and ring lines to said second subscriber set and disconnecting said first subscriber set from said first pair of tip and ring lines; and

means responsive to said second ring current detector means or said loop current detector means for preventing said connecting means from operating.

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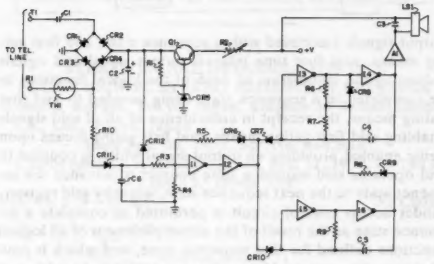
## 3,965,307
## ELECTRONIC TONE RINGER

**Robert P. Dimmer, Lombard, Ill., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.**

**Filed May 28, 1974, Ser. No. 473,852**
**Int. Cl.² H04M *1/00***
**U.S. Cl. 179—84 T** **5 Claims**

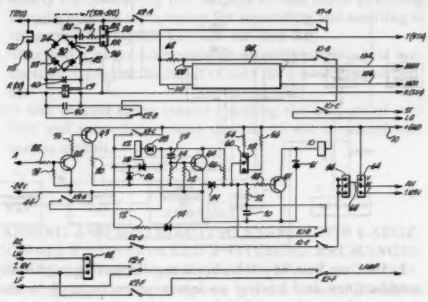



1. A tone ringer for use in a telephone subset connected to a telephone line, comprising: a rectifier circuit connected to said telephone line, operated in response to ringing signals received over said telephone line, to convert said ringing signals to DC potential; a first oscillator circuit including a plurality of frequency determining components operated to generate tone signals at a first frequency; a second oscillator circuit operated to periodically shunt at least one of said plurality of frequency determining components in said first oscillator; a threshold detector including a capacitor charged in response to at least a predetermined value of said DC potential to permit operation of said oscillators, connected between said rectifier and said first and second oscillator; operated in response to said DC potential from said rectifier being less than a predetermined value to inhibit operation of said oscillators and further operated in response to said DC potential from said rectifier being greater than said predetermined value to render said oscillators operated; said first oscillator further operated in response to each shunting of at least one of said frequency determining components, to generate a tone at a second frequency; a transducer connected to said first oscillator operated in response to generation by said first oscillator of tones of said first and second frequencies to audibly reproduce said tones; and party line determining means connected to ground and between said telephone line and said threshold detector whereby said threshold detector is rendered operable only in response to ringing current received over one side of said telephone line.

## 3,965,308
## LINE CARD CIRCUIT

**Wilson Franklin Jones, and Arthur Gene Watkins, both of Santa Ana, Calif., assignors to San/Bar Corporation, Santa Ana, Calif.**

**Continuation-in-part of Ser. No. 377,217, July 9, 1973, abandoned. This application Nov. 11, 1974, Ser. No. 522,790**
**Int. Cl.² H04M *1/21***
**U.S. Cl. 179—99** **10 Claims**



1. In a telephone line circuit for use with key telephone systems including at least one key telephone set having a hold button and connected to a central facility by a pair of line conductors, said key telephone system having a ringing condition during which ringing signals are applied to said line conductors, a seize condition characterized by said line conductors being interconnected by operation of said key telephone, and a hold condition characterized by the connection of a holding impedance between said line conductors in response to operation of the hold button, an interface circuit for coupling a message source to the telephone line circuit in order to provide a message to the calling party over said pair of line conductors for the duration of said hold condition, said interface circuit comprising:

a pair of message input terminals adapted to be connected to a message source;

a pair of message output terminals adapted to be connected across said holding impedance; and

means, connected between said pair of message input terminals and said pair of message output terminals, for automatically preventing the power of the signals being applied to said output terminals from exceeding a predetermined maximum level, irrespective of the power of the signals being applied to said input terminals.

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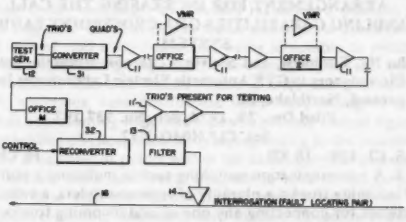
## 3,965,309
## TEST SYSTEM FOR A T CARRIER TYPE TELEPHONE PCM COMMUNICATIONS SYSTEM

**Berton E. Dotter, Jr., Belmont, Calif., assignor to TRW Inc., Los Angeles, Calif.**

**Filed Jan. 14, 1975, Ser. No. 540,813**
**Int. Cl.² H04B *1/60***
**U.S. Cl. 179—175.31 R** **5 Claims**




1. In a pulse code modulation (PCM) type communications system having repeater stations the PCM signal normally

being in bipolar format and where such repeater stations may be tested by a plurality of test signals having relatively low frequencies compared to the PCM rate, such test signals being formed by trio sets which consist of a PCM pulse of one polarity between two pulses of the opposite polarity said pulses occupying three contiguous time slots of said PCM system, a plurality of trio sets of one type forming a trio group, sequential trio groups of opposite types providing a base line shift in the test signal which varies in polarity at a selected one of said low frequencies; said system including means for converting said trio sets to quadruple sets which have four pulses occupying four contiguous time slots for providing a signal which is sequentially bipolar with no dc offset.

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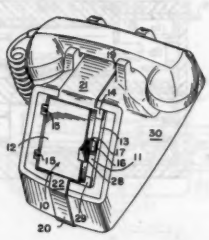
**3,965,310**

## APPARATUS FOR LIMITING ACCESS TO TELEPHONE DIALING AREA

**Alan Willy, 1734 L Ave., National City, Calif. 92050**

**Filed Sept. 23, 1974, Ser. No. 508,426**
**Int. Cl.² H04M 1/66**
**U.S. Cl. 179—189 D** **7 Claims**



1. A telephone dial shielding device for selectively permitting or preventing access to a dialing area of a telephone face, including a frame formed by a plurality of sides extending around the perimeter of the dialing area of the telephone face, a shield pivotally attached to the frame so as to obscure and prevent access to the dialing area of the telephone face when in a closed position, strap means for attaching said frame to the body of the telephone, said strap means for attaching said frame to said telephone body being secured to selective opposing sides of said frame, and means for allowing the securing of the shield to said frame to retain said shield in said closed position adjacent said frame.

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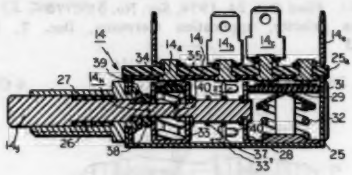
**3,965,311**

## RESPONSIVE TO MOVEMENT IN FIRST AND SECOND OPPOSED DIRECTIONS FOR ESTABLISHING FIRST AND SECOND DIFFERENT INTERCONNECTIONS

**John J. Parolin, South Boston, Mass., assignor to Cole-Hersee Company, South Boston, Mass.**

**Division of Ser. No. 335,779, Feb. 26, 1973, Pat. No. 3,902,159. This application Dec. 30, 1974, Ser. No. 537,349**
**Int. Cl.² H01H 15/10, 3/12**
**U.S. Cl. 200—16 C** **7 Claims**

1. Switching apparatus comprising a switch housing, a plunger mounted for reciprocating axial movements in relation to said housing, spring means urging said plunger in the one of opposite angular direction which promotes a maximum forward and outward extension of said end from a front of said housing, a contact actuator slidable in said directions within said housing, spring means urging said contact actuator in said one forward direction, said plunger being freely mated axially with said contact actuator by way of an opening therethrough, said plunger having an enlargement along one portion thereof between adjoining portions of lesser cross-section, an expandable ring member coaxial with said plunger and having an inner periphery smaller than the outer periphery of said enlargement and smaller than said opening and having an outer periphery larger than the outer periphery of said enlargement and larger than said opening, said enlargement having a periphery smaller than said opening, both the periphery of said enlargement and the opening extending radially to positions which correspond to less than half the distance from the inner to outer peripheries of said ring member, said ring member being disposed between said contact actuator and a front part of said housing, said enlargement being movable axially with said plunger from a forward position ahead of said front part and ring member to a more rearward position, stop means limiting rearward sliding motion of said contact actuator in relation to said housing beyond a predetermined limited



amount, electrical contacts disposed for electrical closure by said contact actuator when in one of its forward and rear positions and for electrical opening when said actuator is in the other of said positions, whereby rearward depression of said plunger causes said enlargement to press said ring member rearwardly and the ring member to slide said actuator rearwardly until the latter is halted by said stop means, whereupon said ring member expands and rides over said enlargement to allow said actuator to be sprung forward, and whereby subsequent forward return of said plunger does not disturb the position of said actuator and said enlargement passes through said ring member as it is held stationary against said front part of said housing.

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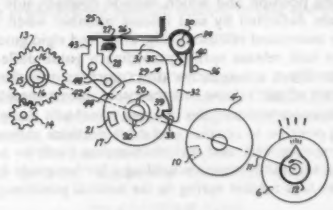
**3,965,312**

## PERCENTAGE TIMER

**Joseph J. Mahon, Libertyville, Ill., assignor to Deltrol Corporation, Bellwood, Ill.**

**Filed Mar. 20, 1975, Ser. No. 560,552**
**Int. Cl.² H01H 7/08, 43/10**
**U.S. Cl. 200—39 R** **10 Claims**



1. In a timing device, the combination of, first cam means mounted for rotation, drive means for rotating said cam means about an axis, said cam means having a peripheral surface formed with a peripheral notch, second cam means mounted about an axis for compound rotary and axial movement, means for rotating said second cam means in a predetermined relationship with said first cam means, said second cam means having a side camming surface, a relatively stationary camming surface cooperating with said side camming surface to cause axial movement of the second cam means as it rotates, a control device, a cam follower biased toward the peripheral surface of said first cam means and riding same, said cam

follower being arranged to actuate said control device from a first position to a second position when the cam follower drops into said peripheral notch, latch means arranged to hold the control device in said second position, and means actuated by axial movement of the second cam means for releasing said latch means at a predetermined angular position of the second cam means.

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## 3,965,313
## RETURN DEVICE FOR A DIRECTION INDICATING SWITCH

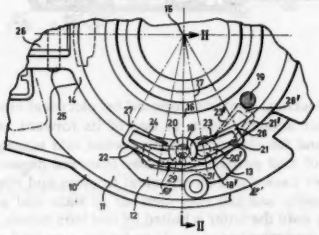
**Erich Mutschler, and Adam Weber, both of Bietigheim, Wurttemberg, Germany, assignors to SWF-Spezialfabrik fur Autozubehor Gustav Rau GmbH**

**Filed Oct. 24, 1974, Ser. No. 517,776**

**Claims priority, application Germany, Dec. 7, 1973, 2361063**

**Int. Cl.² H01H 3/16**

**U.S. Cl. 200—61.27** **6 Claims**



1. A return device for a direction indicating switch used with a vehicle steering wheel, comprising a manually movable switch member movable alternatively and selectively from an intermediate neutral position to a respective first and second indicating position on the respective sides of said neutral position, a release member adapted to be positioned in the neutral position when the vehicle is steered straight ahead and to move with the steering wheel in a direction away from the neutral position toward one of said first and second indicating positions, a release spring pivotally mounted on said switch member and having a first and second drive portion on respective ends which extend toward a respective first and second indicating position and which include resilient side portions which are deflected by said release member when it moves past the associated release spring, and fixed rigid guide means adjacent said release spring providing a guide deflection located to direct a respective drive portion into the path of movement of said release member, said release member being movable upon return of the steering wheel to a straight ahead steering position to contact said drive portions and move said release spring with said switch member back to a starting position, said guide means providing a further guide deflection to center said release spring in the neutral position.

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## 3,965,314
## COLLISION DETECTING SWITCH WITH RECTILINEARLY MOVABLE WEIGHT SENSORS

**Hideaki Sasaya, and Akihiro Kobayashi, both of Aichi, Japan, assignors to Nippon Soken, Inc., Nishio, Japan**

**Filed Oct. 25, 1974, Ser. No. 518,213**

**Claims priority, application Japan, Nov. 13, 1973, 48-131467[U]; Nov. 30, 1973, 48-135107**

**Int. Cl.² H01H 35/14**

**U.S. Cl. 200—61.53** **4 Claims**

1. A collision detecting system comprising:

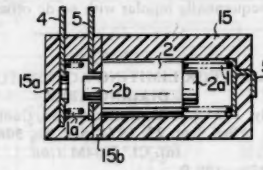
a housing; and

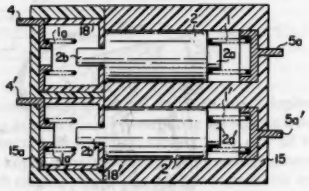
a switch contained within said housing, said switch including:

a weight slidably movable within the housing;

a first spring located within the housing and arranged in contacting relationship with said weight to urge the weight to slide in a first direction;

a second spring located within said housing and arranged in contacting relationship with said weight to urge the weight to slide in a second direction opposite to said first direction, said second spring exerting a force on said weight less than that exerted on the weight by said first spring;





a pair of terminals mounted in spaced relationship in said housing, said terminals having a state of electrical interconnection dependent on the position of said second spring; and

means within said housing for restricting expansion of said second spring when the weight is moved in said second direction in response to a force imparted to the weight in excess of a predetermined value whereby contact between the weight and the second spring is interrupted causing the state of electrical interconnection of the terminals to be altered.

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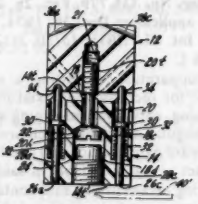
## 3,965,315
## UNIVERSALLY MOUNTED, PIVOTED KEY ACTUCTOR AND ASSOCIATED SWITCH ASSEMBLY

**Guenter J. Wuenn, 61 N. Arlington Ave., East Orange, N.J. 07017**

**Filed Jan. 8, 1975, Ser. No. 539,429**

**Int. Cl.² H01H 3/20, 25/00**

**U.S. Cl. 200—6 A** **10 Claims**



1. A switch construction particularly a rapid data entry switch for connecting a selective contact circuit, comprising a first block member having a first finger contact side and an opposite second side, a second block member having a first side adjacent to said first block's second side and an opposite

second side, universal pivotal support means universally pivotally supporting said first block member on said first side of said second block member, at least one contact rod receiving bore defined through said second block member extending from said first side to said second side, a contact rod movable in said bore, spring means urging said contact rod in a direction to extend out of said first side towards said first block, said first block being pivotal by contact of a protion thereof by a person's finger in a direction to engage said contact rod to displace it in said bore for establishing a connection to the contact circuit, said first and second block members having four sides and being of a rectangular block-shaped configuration, said first block second side and said second block first side having triangular form projections and recesses which are complementarily interengageable.

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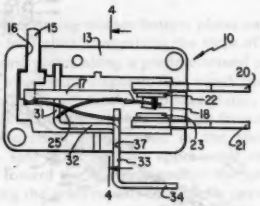
## 3,965,316
## LOW FORCE SWITCH MECHANISM

**Harry William Olson, Woodridge, Ill., assignor to McGill Manufacturing Company, Inc., Valparaiso, Ind.**

**Continuation of Ser. No. 394,970, Sept. 7, 1973, abandoned. This application Jan. 23, 1975, Ser. No. 543,537**

**Int. Cl.² H01H** *13/36*

**U.S. Cl. 200—67 D** **4 Claims**




1. A switch assembly including in combination:

a housing having an enclosure and a coverplate thereon,

a switch operating plunger extending outwardly from said housing,

first and second fixed members within said housing, at least one of which is conducting and forms a contact within said housing and a terminal extending outwardly from said housing,

a common conducting terminal having a body portion positioned within said housing and an end portion extending outwardly from said housing, said body portion further having a blade anchoring part spaced a first predetermined distance from a pair of fulcrum extensions integral thereto and extending inwardly within the housing therefrom,

a one-piece substantially flat, elongated conducting contactor comprising a frame supporting a contact portion, a central blade portion having a free end extending away from the contact portion on said frame, a pair of auxiliary lever arms straddling said central blade portion and having free ends extending from said frame toward the contact portion of said frame, the free ends of said central blade portion and said auxiliary lever arms being spaced apart a second predetermined distance when said contactor is unstressed, said second predetermined distance being greater than said first predetermined distance, said contactor being positioned within said housing with said contact portion between said fixed members and engaging a selected one of said members, the free end of said blade being anchored to the blade anchoring part of said body portion of said common terminal and the free ends of said lever arms each being anchored to different ones of said fulcrum extensions,

said coverplate being secured to said enclosure to hold the switch assembly in assembled relation, such that said plunger is located adjacent the end of said frame remote from the contact portion so that when said plunger is actuated inwardly to engage said frame and to move said contactor, said blade is moved to drive said contact portion to engage the other of said fixed members, and said lever arms bias and return said plunger and contactor portion toward their unactuated positions.

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## 3,965,317
## APPARATUS FOR INDICATING CYLINDER FLUID LEVEL

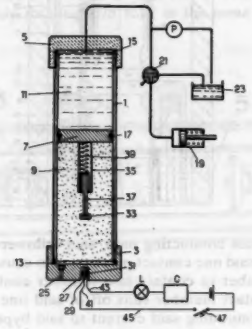
**Jean Louis Gratzmuller, 66 Blvd. Maurice Barres, Neuilly-sur-Seine, France (92200)**

**Filed July 3, 1974, Ser. No. 485,323**

**Claims priority, application France, July 4, 1973, 73.24526**

**Int. Cl.² H01H** *35/38*

**U.S. Cl. 200—82 E** **13 Claims**




1. Apparatus for revealing that a piston has achieved a predetermined position within a pressurized cylinder without requiring an opening in the cylinder which must be separately sealed, comprising a cylinder,

a non-magnetic end closure operatively and sealingly attached to said cylinder and having

an aperture therein extending from the exterior surface of said end closure to a location intermediate the exterior and interior surfaces thereof,

a magnetically operable switch means located in said aperture,

means within said cylinder and operatively connected to a piston, within said cylinder, for movement therewith for actuation of said switch means when said piston is moved to a predetermind position relative to said end closure.

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## 3,965,318
## CONTACT ARRANGEMENT FOR AN ELECTRIC PRESSURE GAS POWER CIRCUIT BREAKER

**Helmut Beier, Berlin, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany**

**Filed Jan. 10, 1975, Ser. No. 539,951**

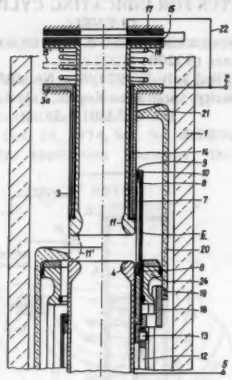
**Claims priority, application Germany, Feb. 7, 1974, 2406143**

**Int. Cl.² H01H** *33/82*

**U.S. Cl. 200—148 R** **5 Claims**

1. A contact arrangement for an electric pressure-gas circuit breaker for interrupting an electric current comprising: two stationary contact pieces disposed so as to conjointly define a gap therebetween; a follower contact disposed on one of said contact pieces in insulated relation thereto and movable in a direction toward the other one of said contact pieces; a bridging contact member movable between first and second positions for electrically joining said contact pieces in said first position and for running off of said one contact piece when moved in said direction toward said other contact piece to said second position thereby electrically separating said contact pieces; electromagnetic actuator means for developing a force

to propel said follower contact along said direction in the opening operation of the breaker; resilient means connected to said follower contact receiving resilient energy as said actuator means propels said follower contact in said direction; current supply means for supplying current to said one contact piece; said follower contact being connected to said current supply means through said electromagnetic actuator means to



define a bypass conducting path, said follower contact being disposed on said one contact piece so as to cause said bridging contact member to contact said follower contact when said bridging contact member runs off of said one contact piece thereby commutating said current to said bypass conducting path whereby said electromagnetic actuator means becomes energized to develop said force.

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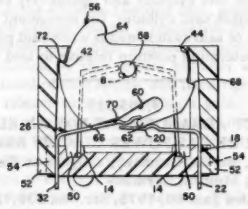
**3,965,319**

## LIGHTED MOMENTARY SWITCH ARRAY

**Joseph Larue Lockard, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed Nov. 7, 1974, Ser. No. 521,725**
**Int. Cl.² H01H 9/00**
**U.S. Cl. 200—310** **2 Claims**



1. An indicator light and switch in combination, comprising:

a housing, a pair of first contacts in said housing, light means having a pair of electrical leads engaged respectively on said first pair of contacts, said first pair of contacts protruding from said housing to form electrical terminals for pluggable connection externally of said housing, a second pair of contacts in said housing initially in spaced overlapping relationship, a cam displaceably mounted in said housing and having a first portion initially in a single stable position interposed between said second pair of contacts, a second portion on said cam being displaceable upon displacement of said cam to deflect one of said second pair of contacts into engagement with the other of said second pair of contacts to complete an electrical circuit therebetween, said first portion of said cam being displaceable away from said position initially interposed between said second pair of contacts to permit mutual engagement of said contacts, and said second pair of contacts protruding from said housing to provide electrical terminals for pluggable connection externally of said housing.

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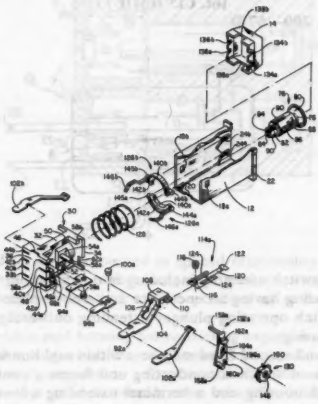
**3,965,320**

## PUSH BUTTON SWITCH

**Albert F. Ditzig, Hoffman Estates, Ill., assignor to Molex Incorporated, Lisle, Ill.**

**Filed Oct. 17, 1974, Ser. No. 515,586**
**Int. Cl.² H01H 9/00**
**U.S. Cl. 200—314** **7 Claims**



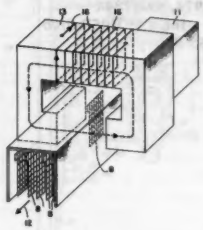
1. In a lighted push button switch for use in an electrical circuit including at least one switch blade assembly connected to said circuit having a switch blade movable between a normal position and an unstable position whereby electricity is allowed to flow through one part of the circuit in one position and another part of the circuit in the other position, said switch blade assembly having terminal components connectable to the circuit, an actuator assembly for moving the switch blade from its normal position to its unstable position having a depressable push button mounted for reciprocal movement, a switch housing encasing said switch blade assembly and said actuator assembly, and support means within said housing mounting said switch blade assembly and said actuator assembly, the improvement in said support means comprising:

a single unitary support member removably mounted within the housing, said support member including vertical web means dividing the interior of the housing into a plurality of portions, each portion capable of mounting a switch blade assembly thereon, a horizontal actuator mounting portion at one end of the web means associated with the actuator assembly, and a horizontal terminal mounting portion at the other end having terminal slots for mounting the terminal components, said terminal mounting portion being flush with the other end of the housing defining the bottom of the switch.

## 3,965,321
## DRYING OF STORAGE BATTERY PLATES

Jurgen Brinkmann, Hagen, and Wilhelm Saul, Hannover, both of Germany, assignors to Varta Batterie Aktiengesellschaft, Hannover, Germany

Filed Sept. 5, 1974, Ser. No. 503,316
Claims priority, application Germany, Sept. 24, 1973, 2348042
Int. Cl.² H05B 5/08
U.S. Cl. 219—10.41 36 Claims



1. The method of drying storage battery plates having active mass pasted on lead grids, comprising the steps of:
transporting said plates along a predetermined path; and
producing an alternating magnetic field which traverses said path generally perpendicularly to said plates, and which alternates at frequencies below the high frequency range such that currents are induced in the short circuits formed by said grids without appreciable current displacement toward the marginal rods of the grids,
thereby heating the grids rapidly and evenly over the entire plate area,
the heating of each grid in turn heating the active mass pasted thereon from the inside and causing progressive drying of the mass from the inside toward the outside of the plates.

13. Apparatus for drying storage battery plates having active mass pasted on lead grids, comprising:
means for transporting said plates along a predetermined path; and
means for producing an alterating magnetic field within said path, said field being oriented generally perpendicularly to said plates along said path,
said field producing means being constructed to produce alternation at frequencies below the high frequency range such that currents are induced in the short circuits formed by the lead grids without appreciable current displacement toward the marginal rods of the grids,
thereby heating the grids rapidly and evenly over the entire plate area,
the heating of each grid in turn heating the active mass pasted thereon from the inside and causing progressive drying of the mass from the inside toward the outside of the plates.

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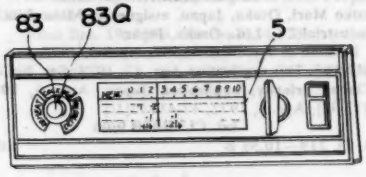
## 3,965,322
## COOKING TIME ADJUSTING ARRANGEMENT FOR USE IN ELECTRONIC OVEN

Fumiko Mori, Osaka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Division of Ser. No. 346,795, April 2, 1973, Pat. No. 3,848,105. This application Apr. 17, 1974, Ser. No. 461,791
Claims priority, application Japan, Apr. 6, 1972, 47-41112[U]; Apr. 6, 1972, 47-41113[U]
Int. Cl.² H05B 9/06
U.S. Cl. 219—10.55 B 11 Claims

1. A cooking time selection and adjusting arrangement for use in an electronic oven of the type including an oven-defining structure having an access opening, means positioned for generating high frequency energy toward the interior of said oven-defining structure, and a hingedly supported door covering said access opening of said oven-defining structure, said time selection and adjusting arrangement comprising:
an instrument panel mounted on said oven-defining structure, said instrument panel having a front surface with a window portion and an aperture therein;
a pair of rolls rotatably mounted one above the other within said instrument panel;
a belt member having a length greater than the spacing between said rolls, said belt member having opposite ends wound around and connected to said rolls, said belt member having a front surface visible through said window portion of said instrument panel, said front surface of said belt member having thereon data relating to cooking menus and cooking times corresponding thereto;
driving means coupled to at least one of said rolls for synchronously rotating said rolls in the same direction, to




thereby place selected of said menu and corresponding cooking time data on said belt member in a position to be viewed through said window portion;
a timer device mounted in said instrument panel and having an operating shaft extending through said aperture in said instrument panel, said timer device being operatively coupled to said means for generating high frequency energy, whereby an operator may set said timer device to a cooking time of a selected menu visible through said window portion, and operation and stopping of said timer device start and stop said means for generating high frequency energy; and
a movable pointer needle mounted on said instrument panel and operatively coupled to said operating shaft to be moved thereby along said window portion and indicate the operating time of said means for generating high frequency energy corresponding to said cooking time of said selected menu.

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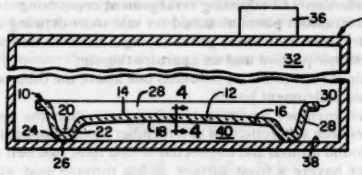
## 3,965,323
## METHOD AND APPARATUS FOR PROVIDING UNIFORM SURFACE BROWNING OF FOODSTUFF THROUGH MICROWAVE ENERGY

Ray B. Forker, Jr., Beaver Dams, and Joseph N. Panzarino, Big Flats, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Feb. 26, 1975, Ser. No. 553,317
Int. Cl.² H05B 9/06
U.S. Cl. 219—10.55 E 7 Claims

1. A browning apparatus for use in combination with microwave ovens comprising a vessel of glass ceramic material, said vessel including sidewall portions and a central bottom wall portion, said central bottom wall portion being connected to said sidewall portion by inner bounding wall portions and a foot portion having a lowermost support surface, said central bottom wall portion having a lower surface provided with an electroconductive coating, said coated lower surface being

vertically displaced above said lowermost support surface and forming a bottom-open recess in said vessel, and said bottom-




open recess being substantially peripherally bounded by said inner bounding wall portions.

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**3,965,324**

## COOKING TIME ADJUSTING ARRANGEMENT FOR USE IN ELECTRONIC OVEN

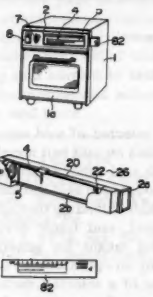
**Fumiko Mori, Osaka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Division of Ser. No. 346,795, April 2, 1973, Pat. No. 3,848,105. This application Apr. 17, 1974, Ser. No. 461,792**

**Claims priority, application Japan, Apr. 6, 1972, 47-41112[U]; Apr. 6, 1972, 47-41113[U]**

**Int. Cl.² H05B 9/06**

**U.S. Cl. 219—10.55 B** **10 Claims**




1. A cooking time selection and adjusting arrangement for use in an electronic oven of the type including an oven-defining structure having an access opening, means positioned for generating high frequency energy toward the interior of said oven-defining structure, and a hingedly supported door covering said access opening of said oven-defining structure, said time selection and adjusting arrangement comprising:

an instrument panel mounted on said oven-defining structure and having a front surface;

a plurality of longitudinal interchangeable strip members each having a front surface having thereon data relating to cooking menus and cooking times corresponding thereto;

mounting means for positioning a selected one of said strip members with respect to said instrument panel to be viewable at a viewing position on said front surface thereof, to thereby place selected of said menu and corresponding cooking time data at said viewing position;

a timer device mounted in said instrument panel and having an operating shaft extending through said instrument panel, said timer device being operatively coupled to said means for generating high frequency energy, whereby an operator may set said timer device to a cooking time of a selected menu at said viewing position, and operation and stopping of said timer device start and stop said means for generating high frequency energy; and

a movable pointer needle on said instrument panel and operatively coupled to said operating shaft to be moved thereby along said selected strip member and indicate the operating time of said means for generating high frequency energy corresponding to said cooking time of said selected menu.

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**3,965,325**

## MICROWAVE OVEN

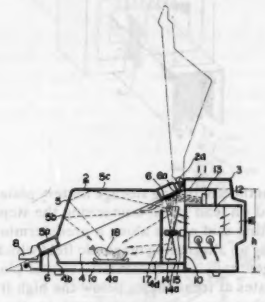
**Kazumi Hirai, Nabari, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**

**Filed Mar. 24, 1975, Ser. No. 561,653**

**Claims priority, application Japan, Mar. 23, 1974, 49-33516; Aug. 14, 1974, 49-97844**

**Int. Cl.² H05B 9/06**

**U.S. Cl. 219—10.55 R** **8 Claims**




1. A microwave oven comprising

main casing portion defining an oven base, lower portion of a heating chamber, and including at least one flat mating surface which is defined by borders of a frame member for said main casing portion and which is inclined at an acute angle with respect to said base,

a door assembly portion which defines a heating chamber upper portion which is complementary to said lower portion and which cooperates therewith to define a complete heating chamber, said door assembly being movable to and held at a closed position wherein said door assembly portion seals said heating chamber, and defining at least one mating surface which comes into flat contact with said main casing mating surface when said door assembly portion is in said closed position, said door assembly being movable pivotally, upwardly to an open position,

heating assembly including high frequency wave generation means, high frequency wave direction means for directing waves generated by said generation means into said main casing portion, and power supply means for supplying electrical power to said generation means,

housing portion for housing said heating assembly.

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**3,965,326**

## WELDING BY ELECTRON BOMBARDMENT

**Francois Corceile, Cergy, and Jacques Courjaud, Parthenay, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France**

**Filed Nov. 25, 1974, Ser. No. 526,813**

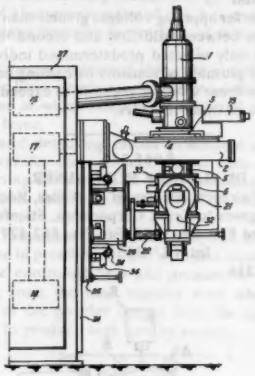
**Claims priority, application France, Nov. 26, 1973, 73.41962**

**Int. Cl.² B23K 15/00**

**U.S. Cl. 219—121 EB** **19 Claims**

1. A machine for welding by electron bombardment which comprises an electron gun for emitting an electron beam, a chamber under continuous partial vacuum in position to receive said electron beam, a working chamber, valve means for interconnecting said partial vacuum chamber and said working chamber, displacement means acting in the same direction

throughout its path and substantially perpendicular to said electron beam for supporting said working chamber, means for continuously holding said electron gun under high vacuum, and narrow orifice means communicating with said



partial vacuum chamber for the passage of said electronic beam thereto, said displacement means being further adapted to act in a direction substantially parallel to said electron beam and being independently adjustable in each of said directions.

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**3,965,327**

## METHOD OF CUTTING MATERIAL TO SHAPE FROM A MOVING WEB BY BURNING

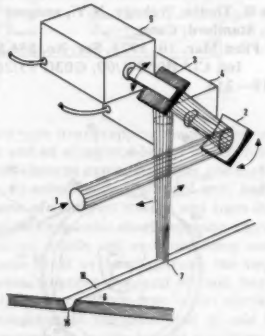
**Günter Ehlscheid, Neuwied; Peter Langenbeck, Frickingen, and Kurt Stemmler, Neuwied, all of Germany, assignors to Winkler & Dunnebier Maschinenfabrik und Eisenglesserei KG, Neuwied (Rhine), Germany**

**Filed Oct. 8, 1974, Ser. No. 513,022**

**Claims priority, application Germany, Oct. 10, 1973, 2350933**

**Int. Cl.² B23K *26/00***

**U.S. Cl. 219—121 LM** **8 Claims**



1. A method of cutting a predetermined pattern from a moving web of material, such as paper, cardboard or the like, comprising the steps of:

a. generating a laser beam from a laser beam source and directing said beam in a first direction onto a first pivotable mirror;

b. deflecting said laser beam in a second direction by said first pivotable mirror, onto a second pivotable mirror;

c. deflecting said laser beam onto the moving web of material by said second pivotable mirror;

d. passing the laser beam through a slot in a mask immediately prior to its contacting the moving web of material;

e. pivoting said first pivotable mirror to cause said laser beam to travel in a first direction so as to cut through said web along a given path in said moving web of material; and

f. pivoting said second pivotable mirror to cause said laser beam to travel in a second direction so as to cut through said web along said given path in said moving web of material, wherein the first and second mirrors are pivoted about axes which are parallel to each other and to the plane of travel of said moving web of material.

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**3,965,328**

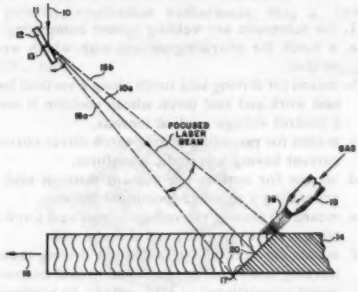
## LASER DEEP CUTTING PROCESS

**Edward V. Locke, Rockport, Mass., assignor to Avco Corporation, Cincinnati, Ohio**

**Filed Dec. 19, 1974, Ser. No. 534,173**

**Int. Cl.² B23K *26/00***

**U.S. Cl. 219—121 LM** **6 Claims**




1. A method of cutting completely through a thick workpiece having a predetermined thickness on the order of 2 inches or more comprising:

a. directing from above said workpiece a concentrated laser beam on and at an acute angle to the surface of said workpiece;

b. moving the laser beam and workpiece relative to one another to define a direction of cut lying in the plane of said laser beam;

c. causing said laser beam to be oscillated at a predetermined rate parallel to the direction of cut through an arc sufficient to form a cutting surface including molten material, said cutting surface extending through said workpiece at an angle substantially normal to the direction of said laser beam at said acute angle to the surface of said workpiece;

d. directing a jet of gas at an angle substantially normal to the direction of said laser beam onto the point of intersection of the laser beam and said cutting surface in said workpiece as the laser beam moves back and forth along said cutting surface; and

e. sweeping the molten material along said cutting surface and out of the bottom of the cut by means of the jet of gas and thereby define said cut as said workpiece and laser beam are moved relative to one another.

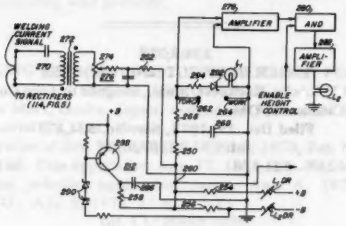
## 3,965,329
## ELECTRICAL SYSTEM FOR AUTOMATIC ARC WELDING

**Petros T. Petrides, 142 Arlington Acres, R.F.D. No. 2, Stonington, Conn. 06378; Russell J. Nickerson, 81 Island View Ave., Mystic, Conn. 06355; Rodney R. Cordeiro, R.F.D. No. 1, Box 422, Flanders Road, Stonington, Conn. 06378, and James S. Dodson, Jr., P.O. Box 145, Borough Station, Groton, Conn. 06340**

**Division of Ser. No. 136,503, April 22, 1971, which is a continuation of Ser. No. 804,724, Oct. 29, 1968, abandoned. This application Aug. 5, 1974, Ser. No. 494,596**

**Int. Cl.² B23K 9/06**

**U.S. Cl. 219—124** **2 Claims**




1. An automatic arc welding system comprising:
a. a torch for providing an arc with which work can be welded,
b. means for driving said torch along a vertical line between said work and said torch whose position is responsive to a control voltage applied thereto,
c. means for providing to said torch direct current welding current having a periodic waveform,
d. means for sensing the current through said torch and generating a signal proportional thereto,
e. means for sensing the voltage across said torch and generating a signal proportional thereto, and
f. means for controlling said torch driving means by subtracting said signal proportional to said current from said signal proportional to said voltage, to produce said control voltage.

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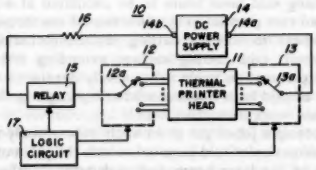
## 3,965,330
## THERMAL PRINTER HEAD USING RESISTOR HEATER ELEMENTS AS SWITCHING DEVICES

**Kenneth S. Williams, Barrington, Ill., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Aug. 5, 1974, Ser. No. 494,145**

**Int. Cl.² H05B 1/00**

**U.S. Cl. 219—216** **17 Claims**




1. A thermal printing system comprising:
thermal printer head means;
a plurality of voltage-current switching characteristic resistors attached to said printer head means, each of said resistors having a threshold voltage;
a plurality of first selector terminals;
a plurality of second selector terminals;
first means for connecting each of said first terminals through a different path to each of said second terminals, each path having at least one of said plurality of resistors and including only different resistors of said plurality of resistors; and
second means for applying voltages greater than said threshold voltage between said first and second terminals for energizing only selected predetermined individual resistors in said plurality of resistors by causing only the voltages across these selected resistors to exceed the threshold voltage of these resistors.

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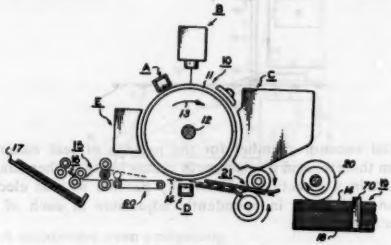
## 3,965,331
## DUAL MODE ROLL FUSER

**Rabin Moser, Fairport, and Ernest A. Weiler, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Feb. 24, 1975, Ser. No. 552,477**

**Int. Cl.² H05B 1/00**

**U.S. Cl. 219—216** **9 Claims**



1. Dual mode fuser apparatus for fixing toner images to various types of substrates, said apparatus comprising:
fuser structure comprising first and second fuser members;
transport structure for conveying said substrates such that the toner images carried thereby contact one of said members during a first mode of operation; and
means for effecting reorientation of one of said structures to move said substrates such that the toner images carried thereby contact the other of said fuser members during a second mode of operation.

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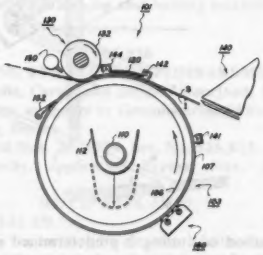
## 3,965,332
## SELECTIVE FUSING APPARATUS

**Raghulinga R. Thettu, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Mar. 10, 1975, Ser. No. 556,858**

**Int. Cl.² H05B 1/00; G03G 15/20**

**U.S. Cl. 219—216** **4 Claims**



1. In an electrostatic reproduction machine in which a dry fusing device for fusing powder images onto copy sheets made of paper is accomplished by passing the sheet bearing the

powder images through a nip defined by rotatable members which apply heat and pressure thereto an improved selective dry fusing apparatus comprising:

a rigid core member made of material which is transparent to radiant energy,

a source of radiation disposed in the interior of said core member transmitting radiant energy,

a layer of elastomeric material which is transparent to radiant energy covering the surface of said rigid core member,

reflector means positioned along the periphery of the elastomeric layer closely spaced thereto defining a heat transfer zone at which radiation is reflected onto the surface of the layer,

tacking and detacking means positioned adjacent to the heat transfer zone to tack sheets with powder images contacting the surface of said elastomeric layer and detack sheets therefrom at the exit in the heat transfer zone, and

pressure roll means positioned at the exit of the heat transfer zone in pressure contact with said elastomeric layer to provide controlled heat and pressure to the copy sheet exiting from the heat transfer zone whereby selective fusing of the powder images onto the copy sheet is effected to produce high quality copies.

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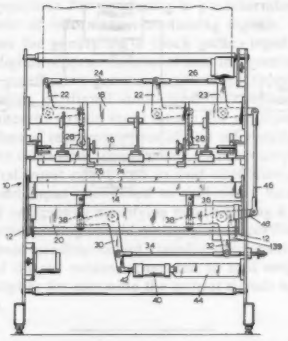
**3,965,333**

## SEAL TEMPERATURE CONTROL MEANS FOR CURTAIN-TYPE WRAPPING MACHINE

**Bertram F. Elsner, and Frank Elsner, Jr., both of Hanover, Pa., assignors to Elsner Engineering Works, Inc., Hanover, Pa.**

**Filed June 9, 1975, Ser. No. 585,305**
**Int. Cl.² H05B *1/00***
**U.S. Cl. 219—243** **6 Claims**



**1.** In a curtain-type overwrapping machine having an elongated anvil bar and an elongated heater bar carrying a resistance-type heater element extending along one surface of said heater bar for co-action with said anvil bar, and means to move at least one of said bars toward and from the other to effect sealing of thermoplastic sheet wrapping and/or banding material around an article and re-constituting said material into a continuous sheet or band thereof; the improvement comprising means adjacent one end of said heater bar to anchor one end of said resistance-type heater element thereto, an anchor block adjacent the other end of said heater bar supported for movement axially toward and from said other end of said heater bar, means to secure the opposite end of said heater element to said anchor block, expansible means operable between said anchor block and said other end of said heater bar to maintain said heater element taut under all conditions of expansion and contraction, a lever pivotally connected intermediately of its ends to said other end of said heater bar, means on one end of said lever engageable by said anchor block to move said lever about its pivot as said anchor block is moved axially of said heater bar in response to expansion and contraction of said heater element, an electrical thermal impulse generator on said machine operable to develop a high amperage current and discharge the same instantly, electrical circuit means connecting said generator to said heater element to develop electrical resistance therein and produce a plastic-fusing temperature in said heater element instantaneously when said generator discharges current to said heater element, and a normally closed micro-switch in said circuit having an actuator positioned adjacent the opposite end of said lever and engageable therewith to actuate said micro-switch to open it when elongation of said heater element reaches a predetermined maximum limit to interrupt the circuit to said heater element and thereby limit the amount of elongation of said heater element which can occur and the consequent maximum ambient temperature which can be generated by the continuous cycling of current to said heater element.

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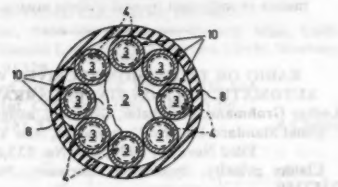
**3,965,334**

## HEATING DEVICE

**George Albert Apolonia Asselman, Eindhoven, Netherlands; David Bruce Green, Weymouth, England; Adrianus Petrus Johannes Castelijns, Eindhoven, Netherlands; Pieter Aart Naastepad, Eindhoven, Netherlands, and Jacob Willem De Ruiter, Eindhoven, Netherlands, assignors to U.S. Philips Corp. New York, N.Y.**

**Filed Apr. 25, 1973, Ser. No. 354,498**
**Claims priority, application Netherlands, May 4, 1972, 7206063**
**Int. Cl. H05b *3/62***
**U.S. Cl. 219—399** **5 Claims**



**1.** A heating device comprising a housing formed as a round tube made of heat insulating material, the tube having an inner peripheral surface and first and second ends, a plurality of heat pipes, each being a hermetrically sealed tube with a first evaporation end, a second condensation end, and capillary material on the inner peripheral surface, said heat pipes situated around and adjacent said housing inner peripheral surface and positioned in parallel with each other and with said housing tube axis, said heat pipes positioned with their first and second ends respectively adjacent said first and second ends of said housing, and at each end of the housing an annular end plate of heat insulating material, secured to and maintaining in relative position said heat pipes and housing tube ends, with a cylindrical heating chamber defined by the space radially inward of said heat pipes.

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**3,965,335**

## PROGRAMABLE DATA ENTRY SYSTEM

**Vincent C. Ricci, Upper Darby, and Lester M. Spandorfer, Cheltenham, both of Pa., assignors to Sperry Rand Corporation, Blue Bell, Pa.**

**Filed Sept. 27, 1974, Ser. No. 509,808**
**Int. Cl.³ G06K *1/16*; G06F *7/06***
**U.S. Cl. 235—61.9 R** **10 Claims**

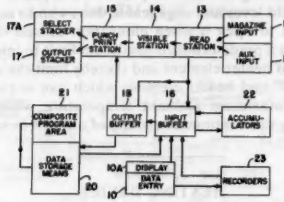
**1.** An internally programable data entry system for preparing data cards comprising:

data entry means having manual and automatic entry load modes,

card input means for receiving prepared cards and blank cards, said prepared cards having indicia means and data thereon,

card reading means connected to said card input means for reading both indicia means and data entered on a said prepared card,

said indicia means on said prepared card indicating whether said data on said card is program data or constant data,




buffer output means connected to said card reading means for receiving and storing indicia means and data read from said card,

control means responsive to said indicia means for automatically storing said indicia means and data from said buffer output means in a program data storage area or a constant data storage area, and

program and constant data storage means for receiving and storing said program data and said constant data from said buffer output means under control of said control means as indicated by said indicia means.

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**3,965,336**

**RADIO OR TELEVISION RECEIVER WITH AN AUTOMATIC STATION FINDING ARRANGEMENT**

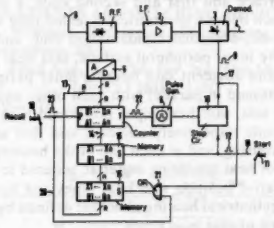
**Lothar Grohmann, Pforzheim, Germany, assignor to International Standard Electric Corporation, New York, N.Y.**

**Filed Nov. 14, 1974, Ser. No. 523,643**

**Claims priority, application Germany, Nov. 16, 1973, 2357359**

**Int. Cl.² H03K *21/36***

**U.S. Cl. 235—92 FQ** **9 Claims**




1. A receiver having automatic station finding capability, comprising:

means for tuning said receiver in response to an applied voltage;

a controllable pulse generator;

means for starting said pulse generator;

circulating counter means having parallel inputs and outputs, a stepping input and a set input, said stepping input connected to and responsive to pulses from said pulse generator for providing a variable digital output;

digital-to-analog converting means for converting the variable digital output from said counter means to a variable analog voltage, said voltage being applied to said tuning means, so that the receiver is tuned to a frequency corresponding to the analog voltage;

means for sensing a received signal and for providing a stop signal to the pulse generator in response thereto, whereby said generator stops providing pulses and the analog voltage remains constant keeping the receiver tuned to the received signal;

memory means having parallel inputs connected to the parallel outputs of said counter means and parallel outputs connected to the parallel inputs of said counter means;

means associated with said memory means for causing the memory means to store a particular digital output from said counter means; and

means associated with the set input of said counter means for selectively causing the digital signal at the counter input to be transferred to the counter output.

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**3,965,337**

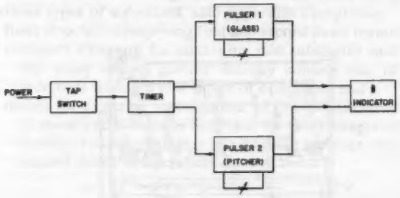
**APPARATUS FOR MONITORING DISPENSED FLUID**

**Loring E. Young, Jefferson, Md., assignor to Ark, Inc., Rockville, Md.**

**Filed Apr. 30, 1975, Ser. No. 573,585**

**Int. Cl.² G06M *3/08*; B67D *5/22***

**U.S. Cl. 235—92 FL** **3 Claims**




1. Apparatus for monitoring fluid dispensed in at least two different unit quantities at corresponding monetary rates, comprising indicator means for registering monetary information representative of the amount of said fluid dispensed at said monetary rates, first and second control means for driving said indicator means substantially continuously, when actuated, to cause said indicator means to register said monetary information substantially continuously at a monetary rate dependent upon which of said control means is actuated, switch means operated concurrently with the dispensing of fluid, and means for causing said first control means to be actuated in response to initial operation of said switch means, so that said monetary information is registered at a monetary rate associated with said first control means, and, after a predetermined amount of switch operation time has elapsed, for causing said second control means to be actuated instead of said first control means, so that said information is then registered at a monetary rate associated with said second control means.

## 3,965,338
## APPARATUS FOR ACHIEVING A PREDETERMINED TRANSFER CHARACTERISTIC

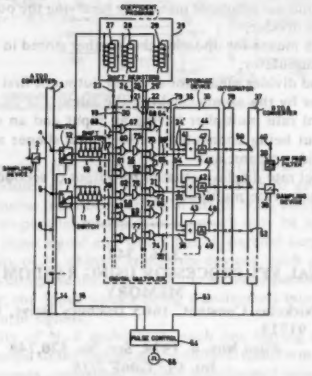
**Petrus Josephus van Gerwen; Hendrik Arie van Essen, and Wilfred Andre Maria Snijders, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Continuation of Ser. No. 474,810, May 30, 1974. This application Sept. 2, 1975, Ser. No. 609,446**

**Claims priority, application Netherlands, June 13, 1973, 7308175**

**Int. Cl.² G06J *1/00***

**U.S. Cl. 235—150.52** **1 Claim**



1. An apparatus for producing a predetermined transfer characteristic of information-containing signals, comprising clock means for generating a clock pulse, input means for supplying digital representations of said information-containing signals; coefficient generator means for supplying a first train of pulses of digital multiplication coefficients; delay means, connected to said input means, for supplying a second train of pulses of representations of said information-containing signals in successive time periods; digital multiplier means, having a first input connected to said coefficient generator, and a second input connected to said delay means and an output, and comprising modifying means having a plurality of settings corresponding to said multiplication coefficients characterizing said predetermined transfer characteristic of said signals; and output means connected to said output of said digital multiplier for summing the output signals appearing at said output.

## 3,965,339
## APPARATUS AND METHOD FOR MEASURING HEART CONDITION

**Bruce E. Mount, Diamond Bar, and James R. Barela, Duarte, both of Calif., assignors to City of Hope-A National Medical Center, Los Angeles, Calif.**

**Filed Apr. 3, 1975, Ser. No. 564,798**

**Int. Cl.² G06G *7/60*; A61B *5/02***

**U.S. Cl. 235—151.3** **8 Claims**

1. In an apparatus for continuously measuring the endocardial viability ratio of a patient for use with sources providing electrical signals representing the patient's systemic arterial pressure and left atrial pressure, the improvements comprising in combination:

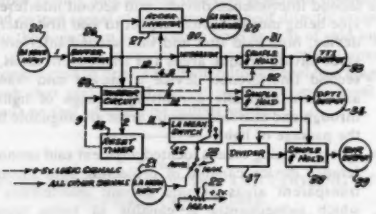
a first input for a first signal varying as a function of the systemic arterial pressure and having a wave form with a leading edge at time $t_0$, a dicrotic notch at time $t_1$, and another leading edge at time $t_2$;

a second input for a second signal varying as a function of the left atrial pressure;

pulse generator means having said first signal as an input for generating a first pulse at times $t_0$ and $t_2$ and for generating a second pulse at a variable time after $t_0$;

display means for displaying said first signal and said first and second pulses, said pulse generator means including means for adjusting the timing of said second pulse to occur at time $t_1$;

an integrator having said first signal as an input;



a switching circuit for connecting said second signal to said integrator as an input during the time period $t_1$ to $t_2$ in subtractive relation with said first signal;

first and second sample and hold units;

means for connecting said integrator output to said first sample and hold unit for the time period $t_0$ to $t_1$;

means for connecting said integrator output to said second sample and hold unit for the time period $t_1$ to $t_2$; and

dividing means having the output of said first and second sample and hold units as inputs for producing the ratio thereof as an output.

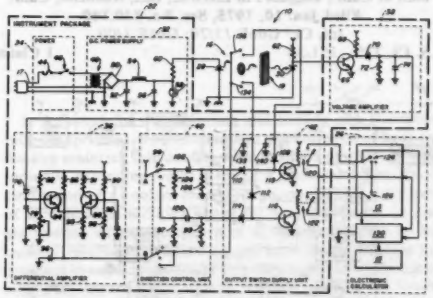
## 3,965,340
## OPTICAL COUNTING DEVICE

**Mathias Renner, 9950 Durant Drive, Beverly Hills, Calif. 90212, and Ronald L. Lyons, 722 Danvers Circle, Newbury Park, Calif. 91320**

**Filed Dec. 26, 1974, Ser. No. 536,544**

**Int. Cl.² G06F *3/05*; G01C *5/00***

**U.S. Cl. 235—151.32** **4 Claims**



1. In combination with an electrical hand calculator, said calculator having a computer unit adapted to make mathematical calculations such as add, subtract, multiply and divide, said calculator including a digital display unit capable of displaying in digit form a numerical value determined by said computer unit, said calculator having a normally operable control panel employable to supply input into said computer unit to make said mathematical calculations, said control panel connected to an additive selection switch and a subtractive selection switch, upon actuation of said additive selection switch a predetermined numerical value is automatically added to the number displayed by said display unit with the then total accumulative value being displayed, upon actuation of said subtractive selection switch a predetermined numerical value is automatically subtracted to the number displayed by

said display unit with the then total accumulative value being displayed, the improvement comprising:

an optical counting apparatus located exteriorly of said electronic calculator and being electrically connected to both said additive and said subtractive selection switches, said counting apparatus capable of actuating said additive and said subtractive selection switches as though the actuation was performed by said control panel;

a first interference device;

a second interference device, said second interference device being movable with respect to said first interference device, both said first and said second interference devices having opaque areas and transparent areas, as said second interference device is moved said transparent areas are alignable permitting passage of light therethrough and also said opaque areas are alignable blocking the passage of light;

a light producing means located adjacent said second interference device capable of projecting light through said transparent areas of said second interference device which subsequently is capable of being transmitted through said transparent area of said first interference device;

light sensitive means located adjacent said first interference device, said light sensitive means being activated during the cycle of receiving no light to receiving light, upon activation of said light sensitive means an electrical signal is transmitted to a control means which thereupon causes activation of said electronic calculator;

the size of the transparent areas on said first interference device being equal to the size of said opaque areas on said first interference device, the size of said transparent areas on said second interference device being equal in size to the size of said opaque areas on said second interference device, both said first interference device and said second interference device comprising a thin sheet of film; and

the size of said transparent areas and said opaque areas on both said interference devices being equal in size.

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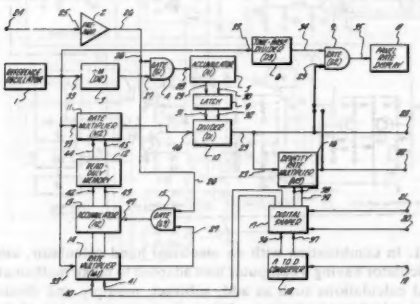
**3,965,341**

## FLOW RATE COMPUTER

**Raymond W. Honey, La Habra, and Louis Katz, Anaheim, both of Calif., assignors to Electrac, Inc., Anaheim, Calif.**

**Filed Jan. 10, 1975, Ser. No. 540,160**
**Int. Cl.[2] G06F *15/20*; G01F *1/00***
**U.S. Cl. 235—151.34** **1 Claim**



1. A Flow Rate Computer for correcting the non-linearity of flow meters comprising:

converter means for converting an analog representation of viscosity to a digital representation;

digital shaper means for digitizing the manual assignment of viscosity and analog representation thereof;

a reference oscillator;

a first rate multiplier having an input and an output, the input being connected to the digital shaper and reference oscillator whereby the first rate multiplier provides a signal proportional to the reference oscillator frequency and the viscosity;

first accumulator means for receiving the output of the first rate multiplier;

a second rate multiplier;

a read-only memory programmed according to flow meter data to provide a signal R to second rate multiplier having an input and an output, the input being connected to the read-only memory and the reference oscillator whereby the second rate multiplier provides a signal proportional to the reference oscillator frequency and R;

a first divider with an input connected to the reference oscillator whereby the first divider provides for division of the reference oscillator frequency by a pre-set integer determined by the flow meter characteristics;

a second accumulator means for receiving the output of the first divider;

a latch means for updating the number stored in the second accumulator;

second divider means for dividing output of first rate multiplier by the number held in the latch;

a third rate multiplier having an input and an output, the input being connected to the digital shaper and second divider means; and

a panel rate display actuated by output of second divider or density rate multiplier.

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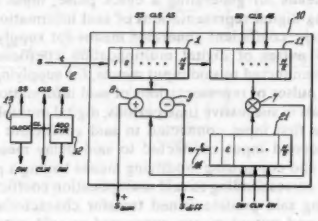
**3,965,342**

## DIGITAL FFT PROCESSOR USING RANDOM ACCESS MEMORY

**James Nickolas Constant, 1603 Danbury Drive, Claremont, Calif. 91711**

**Filed Nov. 4, 1974, Ser. No. 520,748**
**Int. Cl.[2] G06F *7/38***
**U.S. Cl. 235—156** **22 Claims**



1. In a system for the digital implementation of a fast Fourier transform (FFT), the combination of:

a plurality of elements for performing FFT operations with each element including,

first and secnd random access memories (RAMs) for storing signals,

with said second memory connected to said first memory forming a delay line;

a third memory for storing the rotation vector of said FFT;

a multiplier having as inputs the outputs of said second memory and said third memory and providing at its output the product of said signal and said rotation vector;

sum and difference circuits having as inputs the output of said first memory and said multiplier and providing at its output the sum and difference signals required for said element by the FFT algorithm;

an address counter connected to said first, second, and third memories for accessing said memories; and

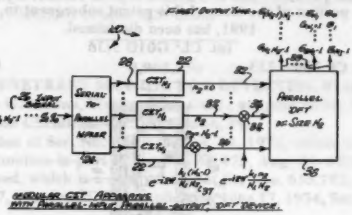
a clock connected to said memories and to said address counter for controlling timing operations of said memories and of said address counter.

3,965,343

## MODULAR SYSTEM FOR PERFORMING THE DISCRETE FOURIER TRANSFORM VIA THE CHIRP-Z TRANSFORM

Jeffrey M. Speiser, and Harper John Whitehouse, both of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 3, 1975, Ser. No. 554,875
Int. Cl.² G06F 15/34
U.S. Cl. 235—156 6 Claims



MODULAR CZT APPARATUS WITH PARALLEL-INPUT, PARALLEL-OUTPUT, DFT DEVICE.

1. Apparatus for combining $N_2$ 32 chirp-Z transform (CZT) modules of length N1 256 in order to generate a discrete Fourier transform (DFT) of length $N_1N_2$ comprising:

a serial-to-parallel multiplexer to which may be applied a serial input signal and which has $N_2$ parallel outputs;

a plurality of $N_2$ chirp-Z transform devices, each of whose inputs comprise the outputs of the serial-to-parallel multiplexer, the input signals being transformed into chirp-Z transform signals;

a plurality of $N_2$-1 multipliers, each one having an input connected to the output of the chirp-Z transform devices, the outputs comprising chirp-Z transformed signals, each signal having a different delay; and

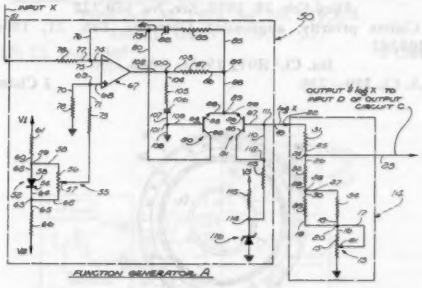
a parallel discrete Fourier transform (DFT) device of size $N_2$, having as inputs the outputs of the $N_2$-1 multipliers in addition to an output directly from one of the chirp-Z transform devices, its parallel outputs comprising the discrete Fourier transformed signals in parallel form.

3,965,344

## COMPUTER UTILIZING LOGARITHMIC FUNCTION GENERATORS

Edgar A. Romo, Costa Mesa, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed July 24, 1975, Ser. No. 598,783
Int. Cl.² G06G 7/20, 7/24
U.S. Cl. 235—197 2 Claims



FUNCTION GENERATOR A

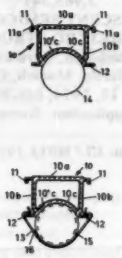
1. A computer responsive to a main input signal directly proportional to a first function $x$ for producing a main output signal of a magnitude directly proportional to a second function $x^{1/y}$, where $y$ is a third function, said computer comprising: a first function generator having an output and being responsive to said main input signal for producing a first output signal at said output thereof directly proportional to 1/y log x; an output circuit having first and second inputs and an output; and a second function generator having an input connected from said output circuit output, said second function generator output being connected to said output circuit second input, said output circuit first input being connected from said first function generator output, said output circuit being constructed to produce a main output signal at said output of said output circuit, said second function generator producing a second output signal at said output thereof directly proportional to the logarithm to the same base as that of said log x of said output circuit main output signal, said output circuit being constructed to drive said main output signal to a magnitude such that said second output signal becomes equal in magnitude to that of said first output signal.

3,965,345

## FIXTURE FOR THE MOUNTING AND COOLING OF FLUORESCENT TUBES

Marc Fordsmand, Charlottenlund, Denmark, assignor to Kicon AG, Ostermundigen, Switzerland

Filed May 9, 1974, Ser. No. 468,637
Claims priority, application United Kingdom, June 26, 1973, 30363/73
Int. Cl.² F21V 29/00
U.S. Cl. 240—47 8 Claims





1. A fixture for the mounting and cooling of a fluorescent tube comprising, in combination, a cooling tube of heat conductive material, said cooling tube having a plurality of longitudinally extending walls defining a hollow interior for the circulation of a coolant therethrough, one of said walls being of arcuate cross-sectional shape for accommodating an arcuate portion of the periphery of a fluorescent tube in heat transfer relationship therewith and with the fluorescent tube disposed in substantially parallel relationship with said cooling tube and means on said cooling tube for supporting a fluorescent tube with the fluorescent tube arcuate peripheral portion in said heat transfer relationship with said cooling tube arcuately shaped wall.

3,965,346

## LIGHT FIXTURE MOUNTING APPARATUS

Joseph L. Thompson, Jr, San Marcos, Tex., assignor to Esquire, Inc., New York, N.Y.

Filed July 14, 1975, Ser. No. 595,674
Int. Cl.² F21V 21/00
U.S. Cl. 240—52 R 4 Claims

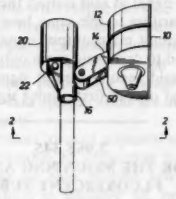
1. A light fixture housing, comprising:

an angled mounting pad fixedly secured to the casing of said fixture providing a flat mounting surface,

a U-shaped bracket for attaching to said mounting pad and having a flat base surface for mating with said mounting surface of said mounting pad,

said base surface including at least one key-hole slot,

said mounting pad including a receiving hole for a bolt, the head of which operates within said key-hole slot,



pivot means mounted within the legs of said U-shaped bracket having an axle with at least one threaded end for receiving a nut to provide tightening of said axle to said bracket at a selectable aiming angle for said housing.

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**3,965,347**

## ELECTROLUMINESCENT SEMICONDUCTOR DIODE WITH HETERO-STRUCTURE

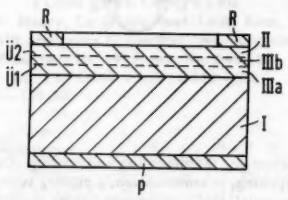
**Walter Heywang, Neukeferloh, Germany, assignor to Siemens Aktiengesellschaft, Berlin, Munich, Germany**

**Filed Nov. 12, 1974, Ser. No. 523,118**

**Claims priority, application Germany, Nov. 14, 1973, 2356844**

**Int. Cl.² H01J *39/12***

**U.S. Cl. 250—211 J** **14 Claims**




1. An electroluminescent diode comprising a homogeneous monocrystalline semiconductor body forming a first zone, an inhomogeneous epitaxial second zone having a forbidden-band-width which changes steadily with increasing distance from said first zone, the second zone having a first sub-zone with properties of a direct semiconductor adjacent said first zone and a second sub-zone interfaced with said first sub-zone, said second sub-zone having the properties of an indirect semiconductor, the junction between the two sub-zones lying parallel to the junction between said first and second zones, said second zone also having a third sub-zone of a conductivity type opposite to that of said first zone and said first and second sub-zones, which third sub-zone is interfaced with said second sub-zone to form a pn-junction with said second sub-zone, the distance between said first and second sub-zone junction and said pn-junction being such that the major part of the charge carriers injected into said second sub-zone from said pn-junction towards said direct semiconductor sub-zone reach said direct semiconductor sub-zone.

**3,965,348**

## METHOD OF AND APPARATUS FOR DETECTING LIGHT AND CONTROLLING JALOUSIES AND THE LIKE

**Leopold Anetseder, Sr., and Leopold Anetseder, Jr., both of Munich, Germany, assignors to Sun-Sor GmbH, Augsburg, Germany**

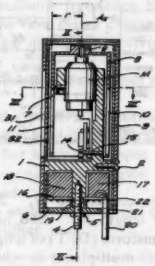
**Division of Ser. No. 400,057, Sept. 24, 1973, Pat. No. 3,885,152. This application Mar. 14, 1975, Ser. No. 558,274**

**Claims priority, application Germany, June 1, 1973, 2327837**

**The portion of the term of this patent subsequent to Dec. 17, 1991, has been disclaimed.**

**Int. Cl.² G01D *5/36***

**U.S. Cl. 250—233** **8 Claims**



1. The combination with a load comprising a motor and a sunshield of a jalousie, window blind, awning, and like type driven by said motor of a sunlight detector for controlling said load and comprising:

a displaceable support;

sensing means having a photosensitive surface fixedly mounted on said support for emitting an electrical output on irradiation of said surface by light;

a housing surrounding said surface and having a wall fixedly mounted on said support and formed parallel to said surface with a generally vertically elongated slit-like window constituting the only light entrance into said housing;

means for angularly displacing said support and thereby displacing said slit window transversely to itself about an upright axis and at a constant distance from said surface through an angle of at least 150°; and

means connecting said sensing means and said load for operating said load according to said output.

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**3,965,349**

## TIME SWITCH WITH ADJUSTABLE PROGRAM

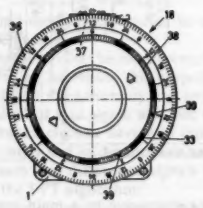
**Aksel Jespersen, Sonderborg, Denmark, assignor to Danfoss A/S, Nordborg, Denmark**

**Filed Feb. 18, 1975, Ser. No. 550,722**

**Claims priority, application Germany, Feb. 21, 1974, 2408343**

**Int. Cl.² H01J *39/12*; G08B *1/00***

**U.S. Cl. 250—236** **2 Claims**



1. A timing device comprising clock works and a rotatable unit driven by said clock works, a reflecting disc having a

reflecting surface mounted on said unit for rotation therewith, a stationary unit in close proximity to said reflecting disc holding a light source which directs a light beam towards said reflecting disc, a program disc mounted on said rotatable unit between said reflecting disc and said stationary unit, said program disc having a predetermined form for masking certain portions of said reflecting surface from said light beam as said rotatable unit rotates relative to said stationary unit, a light sensor on said stationary unit at a predetermined incidence angle relative to light source and said reflecting disc for sensing reflections of said light beam.

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**3,965,350**

## DYE PENETRANT METHOD FOR DETECTING FLOWS

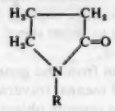
**Orlando G. Molina, Westminster, Calif., assignor to Air Products and Chemicals, Inc., Allentown, Pa.**

**Division of Ser. No. 220,414, Jan. 24, 1972, which is a continuation-in-part of Ser. No. 68,475, Aug. 31, 1970, abandoned, which is a continuation of Ser. No. 655,752, July 25, 1967, abandoned. This application June 17, 1974, Ser. No. 480,057**

**Int. Cl.² G01N *21/38***

**U.S. Cl. 250—302** **8 Claims**

1. A method for detecting cracks and flaws in the surface of an object which comprises applying to said surface a homogeneous liquid penetrant composition which consists essentially of an N-alkyl-2-pyrrolidone, as vehicle, and a fluorescent dye which is soluble in said pyrrolidone, said pyrrolidone having the general formula



where R is an alkyl group containing from 1 to 4 carbon atoms; removing excess liquid penetrant composition from said surface, a portion of said liquid penetrant remaining in said cracks and flaws therein; and viewing the surface of said body under fluorescigenous light to obtain colored traces from the dye in said cracks and flaws.

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**3,965,351**

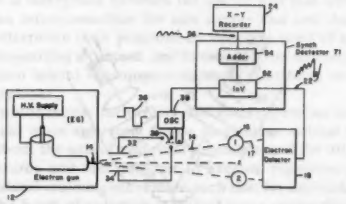
## DIFFERENTIAL AUGER SPECTROMETRY

**Myron Strongin, Center Moriches; Matesh Narayan Varma, Shirley, both of N.Y., and Joshi Anne, St. Louis Park, Minn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed Oct. 30, 1974, Ser. No. 519,324**

**Int. Cl.² G01N *23/04*, *23/227***

**U.S. Cl. 250—305** **5 Claims**




1. The method of controlling micro-Auger spectroanalysis of the surfaces of dilute alloys containing at least two metal elements, comprising:

a. spatially modulating a uniform low energy electron beam having a diameter of at least up to **1mm** of parallel electrons in an Auger spectrometer between first and second locii at a first frequency to produce Auger electrons corresponding to the elements at the locii;

b. collecting the Auger electrons produced when said beam is at said first locus;

c. separately collecting the Auger electrons when said beam is at said second locus; and

d. comparing the spectra of the Auger electrons collected for obtaining the difference therebetween, a pure reference sample being situated at said first locus and a sample of a dilute alloy containing a trace impurity less than 4 atomic percent being situated at the other of said locii so that said difference can be used to negate the Auger electron component from the locus corresponding to the pure reference sample Auger electrons.

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**3,965,352**

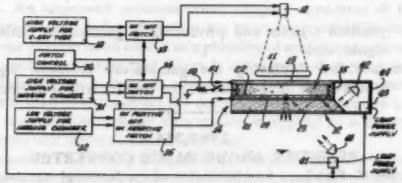
## X-RAY SYSTEM WITH ELECTROPHORETIC IMAGING

**Frank V. Allan, Los Angeles; John B. Fenn, Jr., Canoga Park, and John H. Lewis, Los Angeles, all of Calif., assignors to Xonics, Inc., Van Nuys, Calif.**

**Filed Apr. 24, 1975, Ser. No. 571,220**

**Int. Cl.² G03G *13/00*; G01J *1/00*; H05G *1/00***

**U.S. Cl. 250—315 A** **23 Claims**



1. In an electronradiography imaging chamber for providing a visual image, the combination of:

first and second electrodes;

means for supporting said electrodes in spaced relation with a gap there between, with said first electrode being relatively transparent optically and having a dielectric layer at the surface thereof facing said second electrode;

an X-ray absorber and electron and positive ion emitter in said gap, with X-ray radiation entering said gap being absorbed and providing electrons and positive ions in said gap;

a plurality of electrophoretic particles in said gap; and

means for connecting an electric power source across said electrodes for attracting electrons toward one electrode and positive ions toward the other depending upon the plurality of the power source and forming an electrostatic charge image, with said particles being selectively deposited at said dielectric layer as a function of said electrostatic charge image forming a visual image viewable through said first electrode.

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**3,965,353**

## CROSS-SECTIONAL X-RAY EMISSION IMAGING SYSTEM

**Albert Macovski, 4100 Mackay Drive, Palo Alto, Calif. 94306**

**Filed Dec. 6, 1974, Ser. No. 530,399**

**Int. Cl.² G01T *1/00***

**U.S. Cl. 250—336** **11 Claims**

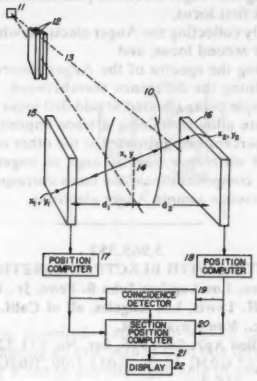
1. Apparatus for producing an image of a cross section of an object comprising:

means for illuminating the cross section with x-rays having energies greater than 1.02 Mev;

position-sensitive detector means for detecting gamma rays emitted from the illuminated cross section due to pair

production and producing a plurality of detected position signals;

means for computing the point of emission of the gamma rays in the illuminated cross section using the detected




position signals and producing a gamma-ray emission signal; and

means for displaying the gamma-ray emission signals whereby an image of the cross section will be formed.

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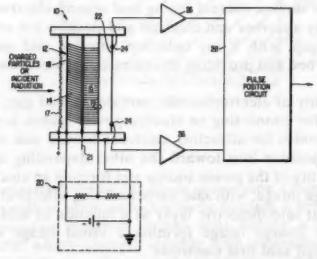
3,965,354

**RESISTIVE ANODE IMAGE CONVERTER**

**James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of; Michael L. Lampton, and Francesco Paresce, both of Berkeley, Calif.**

**Filed Mar. 3, 1975, Ser. No. 555,336**
**Int. Cl.² G01T 1/16**
**U.S. Cl. 250—336** **9 Claims**




1. An apparatus for imaging incident electromagnetic radiation ranging in wavelengths from approximately 10 A° to 2000 A° and charged particles comprising:

a. means for detecting said radiation and charged particles and for producing an amplified and accelerated electron image which corresponds spatially to the incident radiation and charged particles;

b. a continuous resistive target disposed in the path of said amplified and accelerated electron image; and

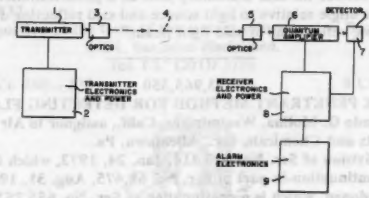
c. means electrically coupled to said continuous resistive target for producing signals representative of at least one of the two spatial coordinates of the points of impact of the electrons upon said target which comprise said electron image.

3,965,355

**LOW POWER INFRARED LASER INTRUSION SYSTEMS**

**Bruce S. Maccabee, 10706 Meadowhill Road, Silver Spring, Md. 20901, and Charles E. Bell, 9717 Delamere Court, Potomac, Md. 20854**

**Filed Oct. 23, 1974, Ser. No. 517,160**
**Int. Cl.² G01J 1/00**
**U.S. Cl. 250—341** **8 Claims**




1. A system which can signal the presence, within a chosen optical path, of an object that is opaque to infrared radiation and which comprises:

a. a radiation generator which produces a beam of infrared radiation,

b. beam forming optical means,

c. radiation collecting and focusing optical means,

d. a quantum amplifier that operates at the same frequency as the infrared radiation generator,

e. an infrared radiation detector which converts an infrared radiation level to an electronic signal level, and

f. electronic means which are capable of signalling a human operator in response to input signal levels from an infrared radiation detector,

and in which the radiation from the generator passes through the beam forming optical means, traverses the chosen optical path whenever there is no opaque object within the said path, passes through the radiation collecting and focusing optical means and into the quantum amplifier, traverses the quantum amplifier and is incident on the infrared detector, and in which the electronic means is so connected to the infrared detector and so interconnected within itself that it signals a human operator whenever the signal level from the infrared detector falls below a certain chosen level.

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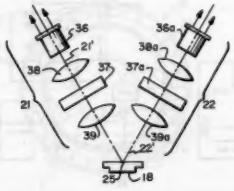
3,965,356

**APPARATUS FOR MEASURING A PREDETERMINED CHARACTERISTIC OF A MATERIAL USING TWO OR MORE WAVELENGTHS OF RADIATION**

**John J. Howarth, San Jose, Calif., assignor to Measurex Corporation, Cupertino, Calif.**

**Continuation-in-part of Ser. No. 573,173, April 30, 1975, abandoned, which is a continuation of Ser. No. 475,628, June 3, 1974, abandoned. This application May 29, 1975, Ser. No. 581,836**
**Int. Cl.² G01N 21/26; G01J 3/34**
**U.S. Cl. 250—343** **9 Claims**




1. Apparatus for measuring a predetermined characteristic of a material using two or more wavelengths of radiation comprising: a radiation source for emitting radiation having a

plurality of wavelengths; a diffusing window for receiving at least a portion of said radiation after impinging upon said material and for reradiating said received radiation; a plurality of radiation detector means each including a filter respectively centered around one of said plurality of wavelengths each of said detector means having an optical axis; means for supporting said plurality of detector means for aligning said optical axes to converge at substantially the same point in proximity to said diffusing window whereby each detector means receives substantially the same image of reradiation.

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**3,965,357**

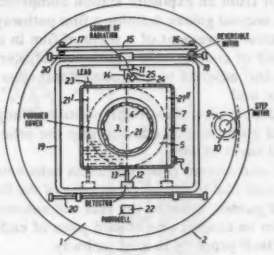
## APPARATUS FOR EXAMINING A BODY BY MEANS OF PENETRATING RADIATION

**Godfrey Newbold Hounsfield, Newark, England, assignor to EMI Patents Limited, Hayes, England**

**Filed Mar. 1, 1974, Ser. No. 447,381**

**Int. Cl.² G01M 23/00**

**U.S. Cl. 250—360** **9 Claims**



1. Apparatus for examining a body by means of radiation, such as X- or gamma radiation comprising

a. a main structural frame,

b. a rotary member defining a central aperture positioned on said main structural frame and being arranged to rotate relative thereto,

c. a body supporting structure for positioning a body to be examined in said central aperture, said body supporting structure being located and arranged to remain stationary relative to said rotary member,

d. a known medium located in proximity with the body supporting structure,

e. a source of penetrating radiation and a detector for receiving a beam of penetrating radiation from said source and producing output signals responsive thereto mounted on said rotary member and located on opposite sides of said body supporting structure,

f. said source, said detector, and said body supporting structure being spatially arranged such that when a body to be examined is supported by said body supporting structure, it is interposed between the source and said detector,

g. an interconnection for said source and said detector to interrelate their positions on opposite sides of said body supporting structure, and to enable them to execute common lateral scanning movements relative to said rotary member,

h. motor means for driving said rotary member relative to said main structural frame to produce orbital scanning about the axis of said rotary member, and for driving said source and said detector to execute repetitive common lateral scanning movement such that for each lateral scan the beam of radiation is carried into a region beyond that region to be occupied by a body when supported by said supporting structure,

i. said lateral and orbital scanning being correlated for providing alternate predetermined increments of orbital and lateral scanning,

j. said known medium being positioned to intercept said beam in said first mentioned region to cause said detector to produce an output signal related to the attenuation of said known medium and independent of the attenuation of the body undergoing examination, and

k. a circuit for combining the last mentioned detector output signals with detector output signals related to the attenuation of the body undergoing examination to reference the latter signals.

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**3,965,358**

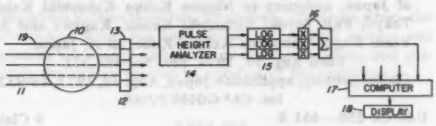
## CROSS-SECTIONAL IMAGING SYSTEM USING A POLYCHROMATIC X-RAY SOURCE

**Albert Macovski, 4100 Mackay Drive, Palo Alto, Calif. 94306**

**Filed Dec. 6, 1974, Ser. No. 530,397**

**Int. Cl.² G01T 1/20**

**U.S. Cl. 250—369** **12 Claims**




1. An improved cross-sectionsl imaging apparatus of the type wherein a polychromatic *x*-ray beam is projected through a cross-section of an object at a plurality of angles and wherein the resultant transmitted beam is detected and applied to a reconstruction computer where the detected transmission data is used to reconstruct the density of the cross-section and the reconstructed image information is applied to a display, wherein the improvement comprises:

means for detecting a plurality of *x*-ray transmission signals representing the intensity of different energy spectra of the transmitted polychromatic *x*-ray beam;

means for deriving the logarithm of each of the *x*-ray transmission signals; and

means for deriving a weighted sum of each of the logarithms of the *x*-ray transmission signals and applying the weighted sum signal to the reconstruction computer.

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**3,965,359**

## IRRADIATION PLANT HAVING A COMMON CLOSURE

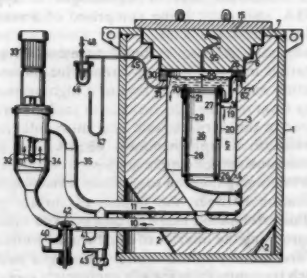
**Ernst Bosshard, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland**

**Filed Sept. 5, 1974, Ser. No. 503,336**

**Claims priority, application Switzerland, Sept. 5, 1973, 12729/73**

**Int. Cl.² G01N 23/12**

**U.S. Cl. 250—432 R** **11 Claims**



1. A plant for irradiating flowable material comprising

an irradiation chamber for receiving the flowable material;
a container within said chamber for receiving a plurality of radiation sources, said container having a plurality of ducts for the introduction and removal of the radiation sources;
a common closure member mounted on said container for closing said ducts in seal-tight relation relative to said chamber; and
a holder clamping said closure member into contact with said container.

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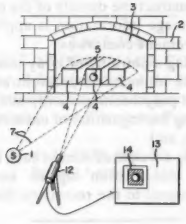
**3,965,360**

**METHOD FOR DISCRIMINATING HIGH-TEMPERATURE RED HEATED MATERIAL**

**Koji Sakasegawa; Atsushi Ohsumi; Tatsue Saito; Yukio Hosaka, all of Fukuyama; Kazuo Kunioka, Yokohama; Tomio Yamamoto, Takamatsu, and Tadashi Asai, Kobe, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo; Fuji Toyuki Kabushiki Kaisha, Kagawa and Asai Yushi Kogyo Kabushiki Kaisha, Kobe, all of, Japan**

**Filed Aug. 19, 1974, Ser. No. 498,371**
**Claims priority, application Japan, Aug. 22, 1973, 48-93282**
**Int. Cl.² G01M *21/38***
**U.S. Cl. 250—461 R** **9 Claims**



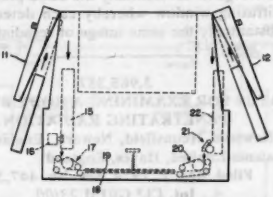
1. A method of discriminating a material radiant at high temperatures in a heating furnace as being radiant from outside the furnace, comprising:
previously placing a discrimination mark on the surface of a material to be discriminated from other materials to be heated in said furnace with a paint which is sensitive to near ultraviolet rays of wavelength of approximately 4358A, said paint being comprised of a manganese frit and a potassium silicate,
charging said marked material together with unmarked materials into said heating furnace for radiant heating,
projecting near ultraviolet rays of a high pressure mercury lamp from outside said furnace to said materials radiant-heated in said furnace, said near ultraviolet rays having a wavelength of approximately 4358A, said painted discrimination mark being responsive to said near ultraviolet rays impinging thereon to produce a visual sharp-contrast indication between the unpainted surface portion and said discrimination mark of said marked material, and
photographing the interior of said furnace while said materials are radiant with a camera having a bandpass filter which transmits substantially exclusively said near ultraviolet rays of wavelength of approximately 4358A in front of the camera lens to discriminate the marked material from the unmarked material while they are radiant.

**3,965,361**

**X-RAY FILM LOADER**

**G. Louis Reser, Cincinnati, Ohio, assignor to Sybron Corporation, Rochester, N.Y.**

**Filed Nov. 29, 1974, Ser. No. 528,136**
**Int. Cl.² G11B *1/00***
**U.S. Cl. 250—468** **5 Claims**



1. Apparatus for transporting cut sheets of x-ray film one at a time to or from an exposure station comprising:
first and second guides defining a film pathway and restricting lateral movement of a sheet of film in said pathway;
a first pair of endless belts positioned adjacent to said first guide and adapted to grip one lateral edge of said sheet of film; and
a second pair of endless belts positioned adjacent to said second guide and adapted to grip the other lateral edge of said sheet of film;
said first and second pairs of endless belts being adapted to allow said film to slip when an edge of the film strikes one of said guides, whereby the film will automatically slip in relation to at least one of said pairs of endless belts and align itself properly in said pathway.

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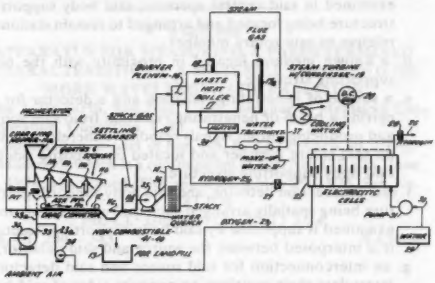
**3,965,362**

**ENERGY SYSTEM FOR PRODUCTION OF HYDROGEN FROM WASTE INCINERATION**

**Gerald J. Harvey, Westbury, N.Y., assignor to New York Testing Laboratories, Inc., Westbury, N.Y.**

**Filed Mar. 20, 1974, Ser. No. 452,683**
**Int. Cl.² F23G *5/04***
**U.S. Cl. 290—1 R** **12 Claims**



1. A closed loop method for producing electric power and pure hydrogen comprising the steps of
a. combining waste material with ambient air and substantially pure oxygen;
b. burning the combined matter in an enclosed region to develop heated gaseous material;
c. mixing the heated gaseous matter with substantially pure hydrogen and igniting the resulting mixture and introducing the ignited mixture into a boiler to generate steam;
d. operating a turbine by the steam generated by the boiler;
e. operating a generator by said turbine to generate electric power;
f. utilizing a portion of the electric power to energize an electrolytic cell structure;

g. supplying said structure with water to enable the structure to produce substantially pure hydrogen and oxygen, all of said oxygen being that oxygen employed in the combining operation of step (a);

h. feeding a portion of the hydrogen produced through step (g) to the steam generator wherein the said portion of hydrogen is that hydrogen employed in the mixing step (c);

said method steps resulting in the burning of waste material at a higher temperature to reduce residue, resulting in the production of useful electric power and further resulting in the production of hydrogen in excess of that used in step (c) for subsequent utilization as a fuel or for other diverse purposes.

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**3,965,363**

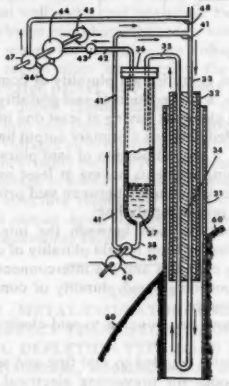
**FUELESS POWER MEANS AND METHODS**

**Wayne Bailey, Box 89, Johnsonville, N.Y. 12094**

**Filed Apr. 18, 1974, Ser. No. 462,189**

**Int. Cl.² H02P** *9/04*

**U.S. Cl. 290—1 R** **4 Claims**



**1.** In a fueless power plant, a heat pick up U tube, well beneath the ground level, said U tube encased in an outer protective tube driven in the ground, one tubular side of said U tube supplying heat pick-up fluid to said U tube, the other side of said U tube being connected to a vapor liquid separation device which is in turn connected to a vapor power producing means and having a second tube surrounding said U tube and encased by the outer protective tube, said second tube holding heat insulating material around the upper portion of said U tube, and including means for returning separated liquid to the fluid supply side of said U tube.

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**3,965,364**

**WAVE GENERATOR**

**Manfred Wallace Gustafson, Gamla Fagerstavagen 4, and Kaj-Ragnar Loqvist, Regnbagsvagen 40, both of 773 00 Fagersta, Sweden**

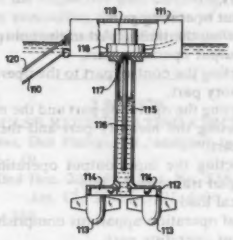
**Filed June 10, 1974, Ser. No. 478,145**

**Claims priority, application Sweden, June 18, 1973, 7308523**

**Int. Cl.² F03B** *13/10*

**U.S. Cl. 290—53** **7 Claims**

**1.** A device for the utilization of energy stored in the wave-motion or heaving of water, comprising at least one buoyant body located at the water surface, wherein said buoyant body is anchored in a way which permits substantially unrestricted movement thereof in an essentially vertical direction independently of the wave height and water depth when acted upon by the heaving waves, at least one lower member connected to the buoyant body, said lower member comprising at least two oppositely rotating propellers on different vertical shafts, said propellers positioned at a distance below the buoyant



body which locates them fully or partially at a depth where the surrounding water has substantially no vertical motion and including an energy collecting means for receiving and collecting the energy created by rotation of the propellers.

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**3,965,365**

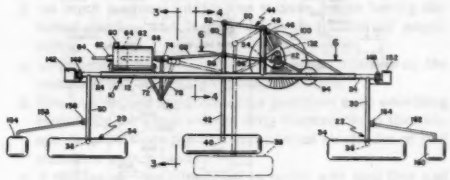
**POWER GENERATING MACHINE ACTUATED BY OCEAN SWELLS**

**Edward L. Parr, 301 N. Cuyamaca, El Cajon, Calif. 92020**

**Filed Jan. 14, 1975, Ser. No. 540,889**

**Int. Cl.² F03B** *13/12*; **B63H** *1/38*

**U.S. Cl. 290—53** **15 Claims**



**1.** A power generating machine for operation by ocean swells, comprising:

an elongated frame;

a pair of support floats attached to and supporting said frame at opposite ends;

a power float mounted on said frame between said support floats;

a hinged pantograph mechanism supporting said power float for substantially vertical motion on the frame;

power generating means coupled to and actuated by motion of said pantograph mechanism;

sensing means for sensing the spacing of adjacent crests of ocean swells;

and actuating means, responsive to said sensing means, for varying the spacing of said support floats to correspond to the spacing of the swells crests.

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**3,965,366**

**ELECTRICAL DEVICES CONTROL SYSTEM**

**Shizuo Sumida; Kazuo Nii, both of Hiroshima; Osamu Shimizu, Himeji; Atsushi Ueda, Himeji, and Mitsuaki Ishii, Himeji, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha and Toyo Kogyo Co., Ltd., both of, Japan**

**Filed Aug. 30, 1974, Ser. No. 501,985**

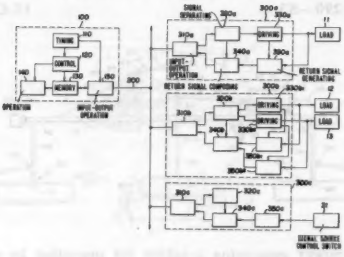
**Claims priority, application Japan, Sept. 3, 1973, 48-99404**

**Int. Cl.³ H02J** *4/00*

**U.S. Cl. 307—39** **8 Claims**

**1.** An electrical device for controlling and monitoring loads comprising:

a central operation apparatus comprising:
a timing part,
a control part,
an operating part,
a memory part,
an input-output operating part,
means connecting the timing part to the control part and to the input-output operating part,
means connecting the control part to the operating part and to the memory part,
means connecting the operating part and the memory part,
means connecting the memory part and the input-output operating part,
means connecting the input-output operating part and a multiple signal transmission line,
a first electrical load,
a first terminal operation apparatus comprising:
an input-output operating part,
a signal separating part,
a return signal composing part,
a driving part,
a return signal generating part,
means connecting the multiple signal transmission line and the input-output operating part,
means connecting the input-output operating part to the signal separating part,
means connecting the signal separating part to the driving part,
means connecting the signal separating part to the return signal composing part,



means connecting the driving part to the first electrical load,
means connecting the driving part to the return signal generating part,
means connecting the first electrical load to the return signal generating part,
means connecting the return signal generating part to the return signal composing part,
means connecting the return signal composing part to the input-output operating part,
a signal source control switch,
a second terminal operation apparatus comprising:
an input-output operating part,
a signal separating part,
a return signal composing part,
a return signal generating part,
means connecting the multiple signal transmission line and the input-output operating part,
means connecting the input-output operating part to the signal separating part,
means connecting the signal separating part to the return signal composing part,
means connecting the signal source control switch to the return signal generating part,
means connecting the return signal generating part to the return signal composing part,
means connecting the return signal composing part to the input-output operating part.

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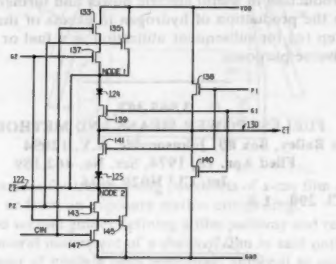
**3,965,367**

## MULTIPLE OUTPUT LOGIC CIRCUITS

**Kenyon Chi-Yen Mei, Union City, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed May 5, 1975, Ser. No. 574,203**
**Int. Cl.² H03K** *19/08, 19/12, 19/20*
**U.S. Cl. 307—207** **3 Claims**



**1.** A logic circuit comprising a plurality of complementary switching elements, a first portion of said plurality of complementary switching elements having at least one interconnecting node and coupled between a primary output line and a first power supply line, a second portion of said plurality of complementary switching elements having at least one interconnecting node and being coupled between said primary output line and a second power supply line;

an electrical shorting path between the interconnecting node of said first portion of said plurality of complementary switching elements and the interconnecting node of said second portion of said plurality of complementary switching elements;

a secondary output line coupled to said electrical shorting path; and

one or more diodes coupled to said first and second interconnecting nodes for preventing electrical conduction between said first power supply line and said second power supply line via said electrical shorting path and one or more of the plurality of complementary switching elements.

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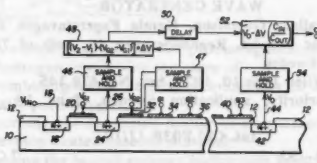
**3,965,368**

## TECHNIQUE FOR REDUCTION OF ELECTRICAL INPUT NOISE IN CHARGE COUPLED DEVICES

**Stephen Perry Emmons, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Oct. 24, 1974, Ser. No. 517,555**
**Int. Cl.² H03K** *3/353;* **H01L** *29/78*
**U.S. Cl. 307—221 D** **13 Claims**



**1.** In a charge coupled device comprising a semiconductor substrate defining a channel and phase electrodes overlying and insulated from a surface of said substrate along said channel, input structure for introducing charge packets into a potential well in said substrate beneath at least one of said phase electrodes under control of input signals applied to said

input structure, output structure for deriving output signals from said channel, and means for applying clock voltages to said phase electrodes for propagating said electrical charge packets along said substrate beneath said phase electrodes toward said output structure, said input structure including:

means for defining a floating doped region having conductivity different from that of said channel, means for introducing an input signal charge packet into said floating doped region dependent on the amplitude of an input signal applied to said input structure, said input signal charge packet characterized by noise uncertainty factor KTC wherein

$k$ = Boltzman's constant;

T = absolute temperature;

C = capacitance associated with said floating doped region;

gate electrode means overlying and insulated from said substrate and disposed between said floating doped region and said one phase electrode;

means for applying a gating voltage to said gate electrode and a clock voltage to said one phase electrode to transfer a quantity of charge dependent on the magnitude of said input signal from said floating doped region into the potential well under said one phase electrode, said quantity of charge also characterized by said noise uncertainty factor; means for sampling the voltage of said floating doped region after introduction thereto of said input signal charge packet, and for sensing the voltage of said floating doped region subsequent to said transfer of charge into said potential well and for deriving from said sensed voltages an error voltage characteristic of the said noise uncertainty factor $k$TC; and means for utilizing said error voltage to modify an output signal produced by said output structure responsive to said input signal to produce an output signal voltage substantially free from said noise uncertainty factor.

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**3,965,369**

## MISFET (METAL-INSULATOR-SEMICONDUCTOR FIELD-EFFECT TRANSISTOR) LOGICAL CIRCUIT HAVING DEPLETION TYPE LOAD TRANSISTOR

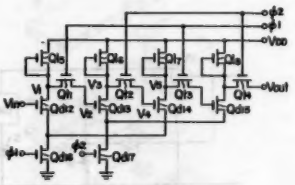
**Yoshikazu Hatsukano, Kodaira, Japan, assignor to Hitachi, Ltd., Japan**

**Division of Ser. No. 381,485, July 23, 1973, Pat. No. 3,917,958. This application May 29, 1975, Ser. No. 581,775**

**Claims priority, application Japan, Aug. 25, 1972, 47-84565**

**Int. Cl.² G11C** *19/28*; **H03K** *23/22, 19/08, 19/20*

**U.S. Cl. 307—221 C** **2 Claims**




1. A MISFET logic circuit comprising:

at least one stage having

a first MISFET having a source, a gate, and a drain electrode;

a depletion type second MISFET having a source, a gate, and a drain electrode;

a logic circuit to which prescribed logic signals are coupled; and wherein

said first MISFET, said depletion type second MISFET, and said logic circuit are connected together in series, with said second MISFET forming a load and with said first MISFET being coupled to receive clock pulses, for driving said circuit, at the gate electrode thereof;

wherein said MISFET logic circuit comprises a plurality of stages connected in cascade to form a shift register circuit, with the respective gate electrodes of the first MISFETs, for controlling the operation of a respective stage receiving clock pulses shifted in time with respect to each other.

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**3,965,370**

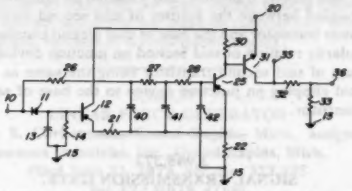
## PULSE REGENERATING CIRCUIT

**Wayne J. Bates, Des Plaines, Ill., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Dec. 20, 1974, Ser. No. 535,006**

**Int. Cl.² H03K** *5/01, 6/06*

**U.S. Cl. 307—268** **7 Claims**




1. A pulse regenerating circuit comprising:

a. a transistor switch having first, second and control electrodes with means for connecting suitable operating power to the first and second electrodes;

b. an input terminal adapted to receive pulses having distorted leading and lagging edges and distorted amplitudes;

c. connecting means coupling said input terminal to the control electrode of said transistor switch;

d. first and second semiconductor junctions each providing essentially the same voltage drop thereacross as the voltage drop between the first and control electrodes of said transistor switch; and

e. a voltage divider connected in series with said first and second semiconductor junctions and the series circuit coupled between said input terminal and a reference point, said voltage divider having an output terminal coupled to the first electrode of said transistor switch and providing a voltage thereto approximately one half the voltage applied to said input terminal minus the voltage drop across one of said semiconductor junctions.

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**3,965,371**

## TEMPERATURE COMPENSATED VIDEO SIGNAL PROCESSING CIRCUIT WITH A VIDEO SIGNAL CLIPPING DEVICE

**Itsuzo Sato, and Kikuo Saito, both of Yokohama, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan**

**Filed May 21, 1975, Ser. No. 579,702**

**Claims priority, application Japan, May 30, 1974, 49-61164**

**Int. Cl.² H03K** *5/08*

**U.S. Cl. 307—237** **4 Claims**

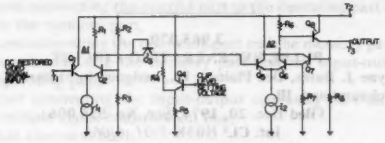
1. A video signal processing circuit comprising:

a first transistor differential amplifier having an input and output, the input of said first transistor differential amplifier being connected to receive a DC restored video signal;

a clipping pn junction device coupled to the output of said first transistor differential amplifier;

a first emitter follower transistor whose base is connected to a bias voltage source to apply a predetermined bias voltage to said clipping pn junction device by an emitter output of said first emitter follower transistor; and

a second transistor differential amplifier including first and second transistors each having an emitter collector and base and connected in common emitter configuration, the base of said first transistor being coupled to the output of said clipping pn junction, a load resistor coupled to the collector of said second transistor, a second emitter follower transistor whose base is coupled to the collector



of said second transistor, and a second pn junction device coupled between the emitter of said second emitter follower transistor and the base of said second transistor, the polarity relation of said second pn junction device to the base of said second transistor being the same as that of said clipping pn junction device to the base of said first transistor.

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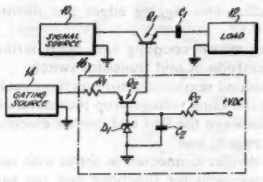
**3,965,372**

## SIGNAL TRANSMISSION GATE

**Morris E. Levine, Staten Island, N.Y., assignor to Wagner Electric Corporation, Parsippany, N.J.**

**Filed Mar. 27, 1974, Ser. No. 455,065**
**Int. Cl.² H03K 17/60**
**U.S. Cl. 307—254** **12 Claims**



1. A bilateral signal transmission gate circuit for bilaterally transmitting and blocking signals of a frequency at least as high as audio frequency comprising DC blocking means, a first bipolar transistor and shunt impedance increasing means connected to said first bipolar transistor's base electrode operative to couple with a high impedance a gating signal to said base electrode, said first bipolar transistor being operative, when gated on by said gating signal, to bilaterally provide a low signal impedance through said DC blocking means between its emitter and collector electrodes and, when off, to bilaterally provide a high signal impedance therebetween, said shunt impedance increasing means being operative to increase the shunt signal impedance between said first bipolar transistor collector and emitter electrodes and ground.

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**3,965,373**

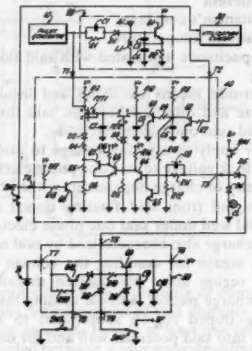
## AUTOMATIC REFERENCE LEVEL ADJUSTMENT CIRCUIT

**Paul A. Carlson, New Providence, N.J., assignor to Wagner Electric Corporation, Parsippany, N.J.**

**Continuation of Ser. No. 312,193, Dec. 4, 1972, abandoned. This application Nov. 4, 1974, Ser. No. 520,552**
**Int. Cl.² H03B 3/02; G11C 27/02**
**U.S. Cl. 307—264** **23 Claims**

1. In a system comprising sensing circuit means for monitoring at least one parameter normally operative to provide a first output signal and operative in response to a predetermined minimum change in at least one monitored parameter to provide a second output signal, and energizing means operative to provide an energizing input to said sensing circuit means, the improvement comprising:

adjustment circuit means operative to receive said energizing input, said first and second output signals, and a first input signal from first circuit means for actuating said



adjustment circuit means, said first circuit means being separate from said sensor circuit means, and operative in response to said first input signal to adjust the energizing input to the sensing circuit means so as to adjust the first output signal of the sensing circuit means to a substantially constant level.

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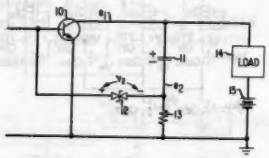
**3,965,374**

## CIRCUIT FOR CONTROLLING THE SWITCHING TIMES OF INVERTING SWITCHING DEVICES

**William Anders Peterson, Lake Parsippany, and James Carroll Wadlington, Summit, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed May 5, 1975, Ser. No. 574,428**
**Int. Cl.² H03K 17/00**
**U.S. Cl. 307—318** **8 Claims**



1. A circuit for controlling the switching time of an inverting switching device comprising:

a capacitor for connection to the output terminal of said inverting switching device;

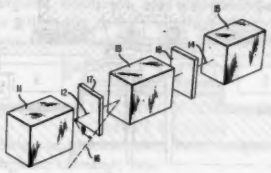
a resistor connected between said capacitor and a terminal of fixed potential; and

a double Zener diode having one lead connected to said capacitor and having the other lead for connection to the input terminal of said inverting switching device.

## 3,965,375
## LITHIUM PERCHLORATE TRIHYDRATE NONLINEAR DEVICES

John George Bergman, Jr., Rumson; Glen Robert Crane, Scotch Plains; Raymond Nichols Storey, Orange, all of N.J., and Denise Williams, East St. Louis, Ill., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 21, 1975, Ser. No. 560,332
Int. Cl.² H02M 5/04
U.S. Cl. 307—88.3 2 Claims

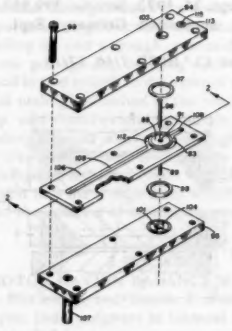


1. A device comprising a crystalline body consisting essentially of $LiClO_4.3H_2O$, with means for introducing into said crystalline body a beam of coherent plane polarized electromagnetic radiation of a first wavelength of approximately 5300 Angstroms, and means for utilizing a beam of coherent electromagnetic radiation of a second wavelength of approximately 2650 Angstroms emitted from said body, the said body being positioned in such a way that the angle between the beam of first wavelength and the optic axis of said crystalline body is such that the first beam and second beam are essentially noncritically phase matched within the crystal at approximately room temperature.

## 3,965,376
## PULSED DROPLET EJECTING SYSTEM

John P. Arndt, Cleveland, Ohio, assignor to Gould Inc., Rolling Meadows, Ill.

Division of Ser. No. 330,360, Feb. 7, 1973, Pat. No. 3,832,579.
This application July 12, 1974, Ser. No. 487,876
The portion of the term of this patent subsequent to Aug. 27, 1991, has been disclaimed.
Int. Cl.² H01L 41/08
U.S. Cl. 310—8.5 4 Claims



1. In a pulsed droplet ejecting system having a reservoir containing liquid; having a conduit communicating with said liquid in said reservoir and filled with said liquid; having a nozzle terminating said conduit and filled with said liquid; and having a transducer coupled to the liquid in said conduit and adapted to apply a pressure pulse to said liquid when an electric pulse is applied to said transducer thereby causing ejection of liquid from said nozzle, the improvement which comprises:

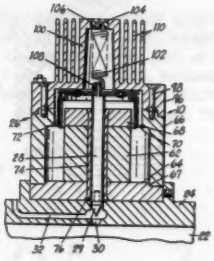
said conduit comprising viscoelastic material extending along a substantial length of said conduit in contact with said liquid;

said transducer comprising a piezoelectric plate having two opposed major faces with electrodes thereon, and electric terminals connected to said electrodes, said transducer being coupled substantially only at an edge portion thereof to said liquid within said length of conduit which comprises viscoelastic material, substantially the full areas of said major faces being free of coupling to said liquid, and said transducer being adapted to expand parallel to said major faces when an electric pulse is applied to said terminals thereby applying a pressure pulse to said liquid causing ejection of liquid from said nozzle, said conduit being dimensioned relative to the properties of the liquid and to the viscoelastic propeties of the conduit material so that reflected wave energy therein caused by an ejected droplet is too weak to substantially interfere with the ejection of a subsequent droplet.

## 3,965,377
## LINEAR FORCE GENERATOR

Gordon S. Carbonneau, Grand Rapids, Mich., assignor to Carbonneau Industries, Inc., Grand Rapids, Mich.

Filed June 21, 1973, Ser. No. 372,335
Int. Cl.² H02K 41/00
U.S. Cl. 310—14 19 Claims



1. A linear force generator for use in regulating an internal combustion engine comprising,

a magnetic generator including a permanent magnet housed in a surrounding case and having a magnetically conductive tip located in opposed spaced relation to an annular pole face on the open end of the case,

said case, magnet and pole tip defining a central bore,

bearing means located in the ends of said bore,

an actuating pin extending through said bearing means and adapted at one end for regulating a function of said engine,

a coil carrying disc mechanically connected to said pin in axially spaced relation over said pole face,

a coil carried by the periphery of said disc and projectting in spaced relation into the gap between said pole tip and said pole face,

a cover secured over the open end of said case and enclosing said disc in axially spaced relation to said pole tip,

coil spring means arranged to bias said pin and said coil to a retracted position of said coil outwardly from said pole tip and pole face,

electrical terminal connections carried exteriorly on said cover,

lead wires on the ends of said coil extending in freely self-supporting and movable relation from said coil to said terminal connections with portions of the wires transverse and askew to the end of said coil,

and stop means coacting between said pin and said case to limit the retracting motion of the pin and coil,

said spring means and the magnetic attraction of said coil relative to said magnet constituting the sole moving force elements acting on said coil.

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## 3,965,378
## POLE COIL FOR ELECTRIC MACHINES AND APPARATUS

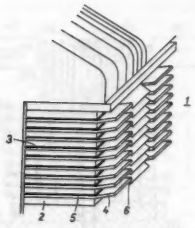
**Wolfgang Liebe, and Werner Leistner, both of Berlin, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany**

**Filed May 23, 1974, Ser. No. 472,701**

**Claims priority, application Germany, May 29, 1973, 2328265**

**Int. Cl.² H02K *1/32***

**U.S. Cl. 310—65** **1 Claim**




1. A pole coil for electrical machines, comprising:

a plurality of aligned turns wound from a flat conductor wound on edge, and

a plurality of cooling fin means corresponding to respective ones of each of said turns, each of said cooling fin means comprising a ribbon disposed in heat-conductive contact with the corresponding turn of said conductor and extending outwardly from the end surfaces of the pole coil, said ribbon being subdivided longitudinally into a plurality of short fin portions projecting out beyond the conductor, said fin portions being disposed successively one next to the other in the longitudinal direction of the conductor and being disaligned in a direction perpendicular to said longitudinal direction so that each two mutually adjacent ones of said fin portions of each cooling fin means are longitudinally disaligned with respect to each other, each of said fin portions being integral with said ribbon and with each other so as to constitute a unitary part of said ribbon, said unitary part being bent to have a wave-like shape to achieve said disalignment of said fin portions, longitudinally corresponding ones of said fin portions of each of said cooling fin means being disaligned in the same direction.

## 3,965,379
## APPARATUS FOR A ROTATING THYRISTOR EXCITATION

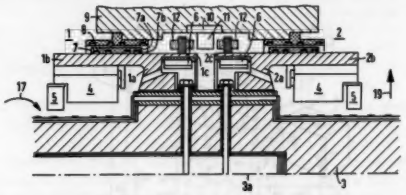
**Otto Meusel, and Otto Dressel, both of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany**

**Filed Nov. 19, 1974, Ser. No. 525,085**

**Claims priority, application Germany, Nov. 29, 1973, 2359578**

**Int. Cl.² H02K *11/00***

**U.S. Cl. 310—68 R** **5 Claims**




1. An arrangement for a rotating thyristor excitation in a turbogenerator including a machine housing and having at least one rectifier wheel including a rotating carrier disc on which the semi-conductor components including elements and protective external components and associated electronic driver units for the semi-conductor components are disposed, the turbogenerator including at least a three-phase main exciter machine, wherein the improvment comprises a carrier disc of the rectifier wheel in the form of a hub securely mounted over the shaft, said hub having hollow-cylindrical projections extending axially on both sides to form with the shaft an annular recess, with the semi-conductor components including their cooling elements and protective external components disposed on the inside of one projection and the associated driver units on the inside of the other projection and insulated against the carrier disc and a contactless and brushless signal transmission device having a stationary part mounted in the machine housing of the turbogenerator and having a rotating part mounted to the outside diameter of said carrier disc.

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## 3,965,380
## SLIDING ARMATURE BRAKING MOTOR

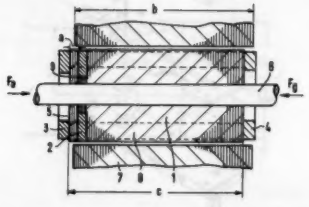
**Jaroslav Stepina, Kaiserslautern, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany**

**Filed Sept. 24, 1973, Ser. No. 399,950**

**Claims priority, application Germany, Sept. 25, 1972, 2246962**

**Int. Cl.² H02K *7/16, 17/18***

**U.S. Cl. 310—77** **5 Claims**




1. A sliding armature braking motor of the type having a cage rotor which braking motor provides an increased axial force, comprising:

a. a laminated stator;

b. a plurality of rotor laminations mounted on a rotor shaft with the stack of rotor laminations having one end lying outside the axial limitations of the corresponding end of the stator laminations when in an unenergized condition;

c. a plurality of rotor bars inserted in slots in said laminations;
d. an intermediate short circuit ring arranged in said stack of laminations near said one end said intermediate short circuit ring having an electrical conductivity as high as that of the rotor bars and in electrical contact therewith;
e. a first end face short circuit ring electrically connected to said rotor bars at the other end;
f. a second end face short circuit ring placed at said one end in electrical contact with said rotor bars and wherein said intermediate short circuit ring is placed so that in the unenergized condition, said intermediate short circuit ring is within the radial limitation of the corresponding end face of said stack or stator laminations.

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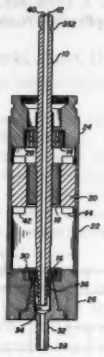
**3,965,381**

## ELECTRIC MOTOR HOUSING WITH INTERIOR SHIELD AGAINST LIQUIDS

**Vern D. Shipman, Richardson, Tex., assignor to Headway Research, Inc., Garland, Tex.**

**Division of Ser. No. 267,683, June 29, 1972, Pat. No. 3,862,856. This application Sept. 12, 1974, Ser. No. 505,256**
**Int. Cl.² H02K 5/10**
**U.S. Cl. 310—88** **5 Claims**



1. A construction for an electric motor, comprising:
a. a stator housing having a top end cap, said end cap having an aperture through which the rotor shaft extends, and said aperture being surrounded interiorly of the cap by an upstanding lip and a trough, and said housing having at least one passage for draining such liquids as may be captured in said trough to the exterior of the housing; and
b. a shield sealingly attached to the rotor shaft interiorly of the cap, said shield extending radially outward over said upstanding lip and above the trough, whereby liquids which may pass through the aperture in the end cap and flow alongside the rotor shaft will flow radially off the shield and into the trough from which they subsequently drain to the exterior of said stator housing.

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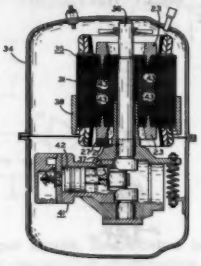
**3,965,382**

## ROTOR HAVING BALANCE WEIGHTS

**Warren N. McCrosky, and Dennis F. Peterschmidt, both of Fort Wayne, Ind., assignors to General Electric Company, Fort Wayne, Ind.**

**Filed Oct. 3, 1974, Ser. No. 511,512**
**Int. Cl.² H02K 1/22**
**U.S. Cl. 310—261** **6 Claims**

1. A rotor for use in an induction type dynamoelectric machine comprising a magnetizable core having a plurality of conductor slots; slot conductors of nonmagnetic electrically conducting material cast in the slots; at least one end conductor having at least one weight mounting means for receiving a balance weight, the end conductor interconnecting at least some of the slot conductors; and a balance weight; the weight mounting means being a stud having an enlarged portion with the enlarged portion cast into the at least one end conductor,



said enlarged portion being embedded in the at least one end conductor to firmly anchor the weight mounting means therein; and the balance weight being positioned on the stud and being secured thereto so that the balance weight fixedly becomes part of the rotor.

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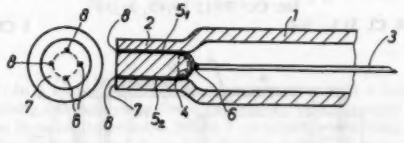
**3,965,383**

## MULTI-WIRE OXYGEN ELECTRODE AND METHOD OF MANUFACTURING THE SAME

**Helmut List, and George Fredericks, both of Graz, Austria, assignors to AVL AG, Schaffhausen, Switzerland**

**Filed Mar. 6, 1975, Ser. No. 555,767**
**Claims priority, application Switzerland, Mar. 15, 1974, 3642/74**
**Int. Cl.² H01J 5/50**
**U.S. Cl. 313—331** **7 Claims**



1. A multi-wire oxygen electrode, comprising a glass electrode tip having a reactive electrode surface at one end, a substantially semi-spherical support surface arranged coaxially with respect to the electrode tip at the other end thereof, a glass sleeve connected to the electrode tip at said other end, a cathode wire arranged in the glass sleeve and having one end held in the electrode tip at the apex of the support surface, and a number of electrode wires fused in said electrode tip, each electrode wire being secured at one end in electrically conductive manner to said one end of the cathode wire at the apex of the support surface, being guided through a substantially one-quarter arc over the support surface and then substantially parallel to the longitudinal axis of the electrode tip to said electrode surface, and having its other end freely exposed at said electrode surface, the exposed ends of the electrode wires being distributed about a circle.

## 3,965,384
## IGNITION PLUG FOR USE IN INTERNAL COMBUSTION ENGINES

**Kazue Yamazaki, c/o Mrs. Chiyo Toyoda, 17-34, Shakujii-cho 6-chome, Nerima, Tokyo, Japan**

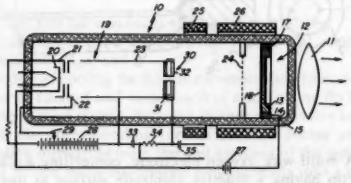
**Filed May 22, 1974, Ser. No. 472,386**
**Claims priority, application Japan, July 18, 1973, 48-81067**
**Int. Cl.[2] H01T** *13/20*
**U.S. Cl. 313—142** **13 Claims**

1. In an ignition plug including a metal outer shell and a central electrode supported by and electrically insulated from the shell and a side electrode extending from the shell toward said central electrode and forming therewith a spark gap, the improvement comprising a plurality of members formed of wire mounted to and projecting forwardly of said shell and delineating a space surrounding said spark gap, the distance between said wire members and said spark gap exceeding the width of said spark gap, and said plurality of wire members including at least one pair of wire members each having a horizontal linear portion substantially parallel to and coplanar with said side electrode.

## 3,965,385
## SEMICONDUCTOR HETEROJUNCTION TELEVISION IMAGING TUBE

**Amos Picker, Sharon, and Wolfgang M. Feist, Burlington, both of Mass., assignors to Raytheon Company, Lexington, Mass.**

**Continuation of Ser. No. 437,578, Jan. 28, 1974, which is a continuation of Ser. No. 283,126, Aug. 23, 1972, abandoned, which is a division of Ser. No. 76,920, Sept. 30, 1970, abandoned. This application Dec. 12, 1974, Ser. No. 531,956**
**Int. Cl.[2] H01J** *29/45, 31/38*
**U.S. Cl. 313—366** **1 Claim**



1. An electron tube device comprising in combination: a target structure comprising:

a substrate of semiconductor material comprising N-doped silicon;

a layer of dielectric material selected from the group consisting of antimony trisulphide and amorphous silicon doped with boron containing approximately 1% boron and silicon dioxide containing approximately 1% boron, said layer having a thickness in the range of 100 A to 10,000 A, said dielectric material being of substantially greater resistivity than said substrate; and

a conductive layer comprising tin oxide contiguous to said layer of semiconductor material, said conductive layer being substantially transparent, and said layer being disposed upon the side of said substrate opposite said dielectric layer;

means for providing a beam of electrons;

means for focusing said beam of electrons;

means for directing said beam of electrons towards selected positions upon said dielectric layer;

means for controlling the amount of current flow in said electron beam;

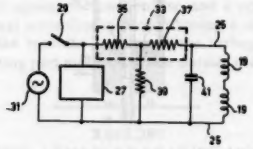
a semiconductor charge carrier multiplier, said multiplier being positioned between said means for providing said beam of electrons and said target structure; and

an evacuated envelope containing said target structure, said means for providing a beam of electrons, said focusing means, and said directing means.

## 3,965,386
## DEGAUSSING DEVICE FOR A COLOR TELEVISION DISPLAY TUBE

**Jan Hendrik Duistermaat; Jan Gerritsen, and Constantius Johannes Waltherus Panis, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Sept. 3, 1974, Ser. No. 502,516**
**Claims priority, application Netherlands, Sept. 13, 1973, 7312607**
**Int. Cl.[2] H01J** *29/07, 29/84;* **H01F** *13/00*
**U.S. Cl. 315—8** **2 Claims**



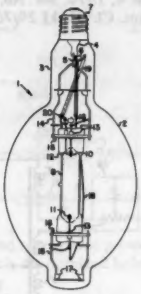
1. A color cathode ray tube having an evacuated envelope including a neck portion, a truncated conical front portion and deflection means located at the junction of said neck and front portions and, within said envelope, means to generate a number of electron beams emanating in a substantially horizontal plane during the normal operating condition of the tube, a color selection electrode made of a ferromagnetic material and provided with a plurality of slots, a display screen at the wide end of said front portion, said screen having a plurality of phosphor stripes, said slots and said stripes being arranged according to a pattern of lines which extend substantially vertically during the normal operating condition of the tube, a degaussing device comprising a shield of ferromagnetic material disposed substantially parallel to the conical wall of said front portion, at least one degaussing coil embracing a major surface portion of said conical wall and oriented such as to provide, when energized by an alternating degaussing current, a substantially vertically directed magnetic field in said color selection electrode, and shunting means connected parallel to said degaussing coil and having an impedance which is higher than that of said degaussing coil at the frequency of the degaussing current but lower at the frequency of the line deflection current.

3,965,387

## ELECTRIC LAMP AND THERMAL SWITCH THEREFORE

Karl D. Stuart, Wickliffe; Juris Sulcs, East Cleveland, and P. Kennard Wright, III, Cleveland Heights, all of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed June 24, 1974, Ser. No. 482,335
Int. Cl.² H01J 7/44, 13/46, 17/34, 19/78
U.S. Cl. 315—47 8 Claims



1. An electric discharge lamp comprising:
an outer envelope,
an inner arc tube located within said outer envelope and containing an ionizable medium,
said arc tube having electrodes at opposite ends including at one end a main electrode plus an auxiliary starting electrode supported on inleads sealed through the tube wall, and a thermal switch within said outer envelope comprising a bimetal element having its root end fastened to one of said inleads,
a springy conductor attached to the distal end of said bimetal and retroverting alongside thereof,
said conductor being located on the convex side of the bimetal as it bends with rising temperature,
said bimetal and conductor being disposed so that the free end of the conductor engages the other of said inleads to short-circuit said main and auxiliary electrodes together at switch closure,
said conductor bending in the same direction as the bimetal to accommodate further curvature of the bimetal resulting from heating thereof beyond closure temperature whereby neither the bimetal nor the spring conductor is stressed beyond its elastic limit.

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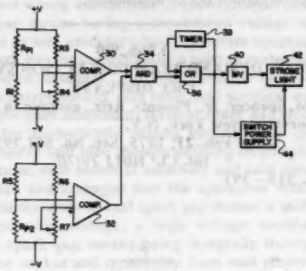
3,965,388

## DIGITAL LIGHT RESPONSIVE SWITCHING CIRCUIT

Richard A. Brisk, Arlington, Mass., assignor to Arthur D. Little, Inc., Cambridge, Mass.

Filed Dec. 13, 1974, Ser. No. 532,594
Int. Cl.² H05B 39/04
U.S. Cl. 315—155 8 Claims

1. A digital light responsive switching circuit comprising:
at least first and second electrically isolated photosensors each responsive to a respective light source, at least one being responsive to ambient light and the other being responsive to a signal light;
at least first and second comparator circuits each having a threshold level representing respective input light conditions and coupled to a respective one of said photosensors each operative to provide a digital output signal of one signal level in response to incident light greater than said threshold level and of another signal level in response to incident light less than said threshold level; and
control logic operative in response to said digital output signals from said comparator circuits to provide an intended output signal only in response to selected ambient and signal light conditions represented by said received




digital output signals, said control logic output signal adapted for energization of utilization apparatus.

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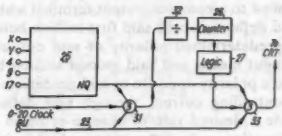
3,965,389

## BEAMED-INTENSITY CONTROL SYSTEMS FOR CATHODE-RAY TUBES

Brian Box English, and Frederick Cross, both of Edinburgh, Scotland, assignors to Ferranti, Limited, Hollinwood, England

Continuation of Ser. No. 139,467, May 3, 1971, abandoned.
This application Aug. 29, 1973, Ser. No. 392,440
Claims priority, application United Kingdom, May 9, 1970, 22540/70
Int. Cl.² H01J 29/52
U.S. Cl. 315—384 10 Claims




1. In a logic circuit for use in conjunction with a beam intensity control system for a cathode-ray rube arranged to have its beam deflected in X and Y co-ordinate directions by trains of incremental X or Y deflection signals occurring at different times and derived from a digital computer also having derived therein signals dependent on said X and Y incremental deflection signals to the extent of remaining steady throughout each train of successive incremental X or Y deflection signals as the case may be, a train of timing pulses a predetermined number of which are associated with each incremental signal and a brightness control signal adapted to be applied to the beam-control electrode of the cathode ray tube the improvement comprising first means for providing a control signal distinguishing the condition in which the incremental X and Y deflection signals occur alternately, from the condition in which either the X or Y signals occur successively, second means for applying to said first means said dependent signals and selected signals from said pulse train such that said first means provides said control signal which distinguishes the alternate incremental deflection signal for X and Y directions from repeated signals for either X or Y directions, and third means responsive to other selected signals from said pulse train and said control signal from said first

means for controlling the application of said brightness control signal to the beam control electrode such that the effective brightness of the beam is reduced whenever said X and Y incremental signals occur alternately.

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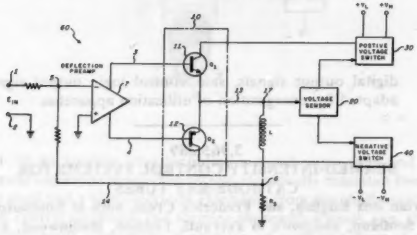
3,965,390

## POWER ON DEMAND BEAM DEFLECTION SYSTEM FOR CRT DISPLAYS

James M. Spencer, Jr., Phoenix, Ariz., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Feb. 21, 1975, Ser. No. 551,795
Int. Cl.² H01J 29/70
U.S. Cl. 315—397 7 Claims




1. In an electron beam deflection control system including a deflection coil and a deflection amplifier wherein the deflection amplifier comprises,

input means for receiving an input signal indicative of the desired deflection of the beam for providing an output signal in response to said input signal;

output means having first and second push-pull operated sections, responsive to said output signal of said input means, each section providing an output, each output coupled to an output lead through which control current is applied to a common output terminal which is coupled to said deflection coil; said first section being responsive to a predetermined polarity of said output signal from said input means and said second section being responsive to a polarity opposite to said predetermined polarity, for controlling current through said deflection coil to provide a desired rate of change of beam deflection in one direction or the other in accordance with the polarity of said output signal of said input means,

sensing means containing a first section and a second section responsive to said outputs of said first and second sections respectively of said output means for providing a sensed output signal representative of each output of said output means;

a multiplicity of voltage sources of a first polarity,

a multiplicity of voltage sources of a second polarity which is opposite to said first polarity; and

switching means containing a first and a second section, coupled to said first and second sections respectively of said sensing means and said output means, said first section of said switching means coupled to said multiplicity of voltage sources of said first polarity and said second section of said switching means coupled to said multiplicity of voltage sources of said second polarity, for switching from a voltage source of one of said polarities to a voltage source of greater magnitude and the same polarity when said output signal of said sensing means exceeds a critical magnitude, and from a voltage source of one of said polarities to a voltage source of lesser magnitude and the same polarity when the magnitude of said output signal of said sensing means is below said critical magnitude thereby a supply voltage of sufficient magnitude is provided to said output means which allows sufficient current to flow through said deflection coil to accomplish the desired rate of change of beam deflection while maintaining linear operation of said output means.

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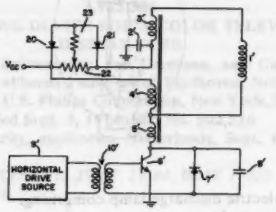
3,965,391

## BALANCED DRIVE HORIZONTAL DEFLECTION CIRCUITRY WITH CENTERING

John W. Lister, Portsmouth, Va., assignor to General Electric Company, Portsmouth, Va.

Filed June 4, 1974, Ser. No. 476,204
Int. Cl.² H01J 29/70
U.S. Cl. 315—408 6 Claims




1. A horizontal deflection circuit exhibiting in its operation a long trace period and short retrace period, and in which a balanced drive voltage is supplied to the circuit's horizontal deflection winding so as to reduce the magnitude of the voltage between the deflection winding and ground and thereby avoid voltage breakdown during said retrace period when a large voltage pulse tends to appear across the deflection winding, comprising:

a. first winding means,

b. second winding means magnetically coupled to said first winding means so that voltages of opposite polarity are generated across said first and second winding means in response to energy applied to said first winding means,

c. a first capacitor,

d. said horizontal deflection winding, said first and second winding means and said first capacitor being connected in a series path between an energy source and a common terminal so that the difference of the voltages generated across said first and second winding means is distributed across the horizontal deflection winding and said first capacitor, said first capacitor being connected between said second winding means and said common terminal,

e. a switching circuit including parallel current paths one of which includes a second capacitor, each of said parallel circuit paths having a direct connection to said common terminal,

f. coupling means for coupling said series path to said switching circuit, whereby alternate operation of said switching circuit causes a voltage to be applied across said deflection winding accompanied by current buildup within said deflection winding during a portion of said trace period, the energy in which is sequentially transferred between said deflection winding and said second capacitor so as to generate in said deflecton winding a horizontal deflection current of generally sawtooth waveform that is shaped by said first capacitor, and

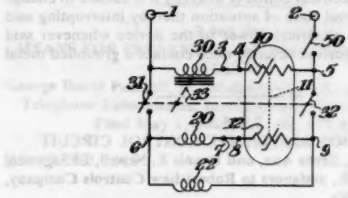
g. a centering network for providing a DC centering current component to said horizontal deflection current, said centering circuit being connected at one end to the junction of said first capacitor and said second winding means and at the other end to said energy source.

3,965,392

## MOTOR START SYSTEM WITH TWO DISSIMILAR PTCR ELEMENTS

William L. Moorhead, and Manfred Kahn, both of Williamstown, Mass., assignors to Sprague Electric Company, North Adams, Mass.

Division of Ser. No. 430,337, Jan. 2, 1974, Pat. No. 3,878,501.
This application Mar. 12, 1975, Ser. No. 557,720
Int. Cl.² H02P 1/44
U.S. Cl. 317—13 A 2 Claims




1. A motor start and run system providing a definitive time delay after the motor is deenergized before said motor may be restarted, comprising:

a. an a.c. motor having a main winding and a start winding;

b. a first PTCR having an anomaly temperature below which said first PTCR is in a low impedance state and above which said first PTCR is in a high impedance state;

c. a second PTCR having an anomaly temperature that is higher than that of said first PTCR, and being thermally connected thereto;

d. a switching control means capable of being connected to an a.c. power source and having an electrical input connected to said first PTCR, and having at least one switch being responsive to a change in impedance of said first PTCR; said means being provided for prohibiting activation of said at least one switch when said first PTCR is initially in said high impedance state, for activating said at least one switch and switching closed the two motor winding circuits to said a.c. power source only when said first PTCR is initially in a low impedance state, and for holding said circuits closed when and after said first PTCR changes from said low impedance state to a high impedance state; and

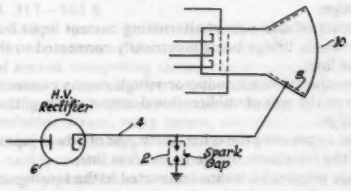
e. a selective heat removal means for cooling said second PTCR faster than said first PTCR.

3,965,393

## TELEVISION X-RADIATION PROTECTION DEVICE AND CIRCUIT

Richard Travers Chamberlain, Arlington Heights, Ill., assignor to Admiral Corporation, Schaumburg, Ill.

Filed Apr. 21, 1971, Ser. No. 135,840
Int. Cl.² H02H 3/00
U.S. Cl. 317—16 2 Claims



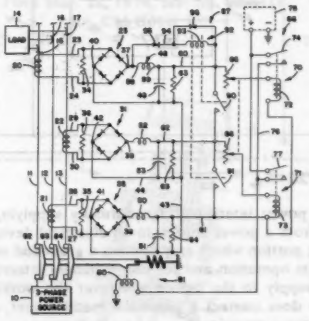

1. In a television receiver circuit, a picture tube including an ultor anode having a predetermined maximum operating voltage, high voltage supply means coupled to said anode for supplying said operating voltage thereto, spark gap means coupled between said supply means and ground for reducing the voltage supplied to said anode in the event the voltage supplied to said anode tends to exceed said predetermined maximum, thereby reducing the operating voltage to a predetermined level where undesirable X-radiation will not occur, said spark gap means having a breakdown voltage approximately equal to said predetermined maximum operating voltage, said spark gap means including a tube of material having a high dielectric constant, a pair of terminal members disposed at the extremities of said tube, said terminal members having interior ends adapted to serve as spark gap electrodes, and means for hermetically sealing said terminal members within the ends of said tube thereby defining an airtight cavity within said tube, said terminal members and said tube being so constructed and arranged that the sparkover voltage between the interior ends of said spark gap means is said predetermined operating voltage, a high voltage rectifier tube socket, said spark gap means being integrally incorporated into said tube socket and removable from said receiver only by removing said socket.

3,965,394

## APPARATUS FOR PROTECTING A MULTIPHASE POWER TRANSMISSION LINE FROM INTERMEMBRAL FAULTS

Homer W. Heinzman, Arlington, Tex., assignor to LTV Aerospace Corporation, Dallas, Tex.

Filed May 19, 1975, Ser. No. 578,452
Int. Cl.² H02H 1/02
U.S. Cl. 317—18 R 13 Claims




1. For a three-phase power transmission system having a power source for supplying three-phase, alternating current to a load through a power transmission line having first, second, and third power conductors, apparatus for interrupting current flow through the transmission line upon the occurrence of an electrical fault permitting current flow between two of the power conductors, the apparatus comprising:

first, second, and third sensing and rectifying means, each having first and second output terminals, for producing respective DC signals corresponding to the AC currents present in the first, second, and third power conductors, respectively, the respective second output terminals of the sensing and rectifying means being interconnected;

first, second, and third filtering circuits connected between the output terminals of the first, second, and third sensing and rectifying means, respectively, the filtering circuits having respective inductors having respective first terminals connected to the first output terminals of the first, second, and third sensing and rectifying means, respectively, and having respective second terminals, first, second, and third output conductors being provided connected to the second terminals of the inductor of the first, second, and third filtering circuits, respectively;

a first voltage responsive switching means for electrically isolating the power source from the power transmission line upon the occurrence of a predetermined voltage differential between the second and first output conductors and, alternatively, between the second and third output conductors;

a second voltage responsive switching means, including two normally open switch elements each connected between one of the output conductors and a respective one of the other output conductors, the second voltage responsive swtching means comprising means temporarily closing the normally open switch elements upon the occurrence of a predetermined voltage differential between one of the first output terminals of the sensing and rectifying means and one of the output conductors, the second voltage responsive switching means comprising a means having a response time, in closing the normally open switch elements, which is shorter than that of the first voltage responsive switching means.

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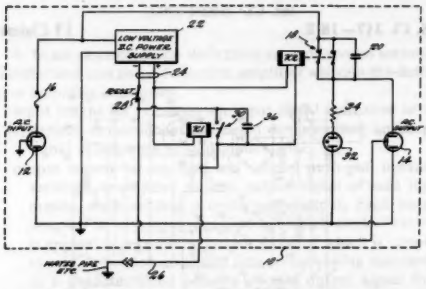
## 3,965,395

## POWER INTERRUPTER FOR ELECTRICAL DEVICES

**Danny J. Young, Tyler, Tex., assignor to James W. Fair, Tyler, Tex., a part interest**

**Filed July 2, 1975, Ser. No. 592,660**
**Int. Cl.² H02H 1/02**
**U.S. Cl. 317—18 R** **10 Claims**




1. A power interrupter for normally supplying electrical power from a power source to an electrical device having a working portion which may contact a grounded metal object during its operation and for automatically interrupting such power supply to the device whenever the working portion actually does contact a grounded metal object, said power interrupter comprising:

input connector means for electrical connection to said power source,

first relay means including first electrical contacts and a first actuating coil having first and second states of actuation for moving said first contacts,

output connector means for electrical connection to said electrical device including an electrical connection to said working portion,

said first electrical contacts being connected in series between said input connector means and said output connector means for normally supplying electrical power to said electrical device when said first actuating coil is in its first state of actuation and for interrupting said supply of power when said first actuating coil is in its second state of actuation,

a power supply means connected to receive electrical power from said input connector means and having first and second output leads for supplying relay actuating electrical energy,

a second relay means including second electrical contacts and a second actuating coil having first and second states of actuation as a function of electrical current passing therethrough for moving said second contacts,

ground connector means for establishing an electrical ground potential,

said second actuating coil being connected in series with said electrical connection to said working portion, said first and second output leads from the power supply means and said ground connector means whereby a circuit is completed through said second actuating coil for the flow of said relay actuating electrical energy whenever said working portion actually does contact a grounded metal object, and

said first actuating coil being connected in circuit with said second electrical contacts whereby it is caused to change to its second state of actuation thereby interrupting said supply of electrical power to the device whenever said working portion actually does contact a grounded metal object.

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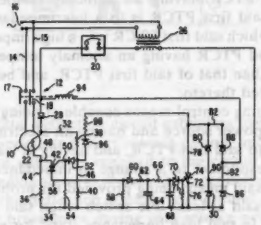
## 3,965,396

## CONDITION RESPONSIVE CONTROL CIRCUIT

**Hugh J. Tyler, Santa Ana, and Dennis E. Newell, El Segundo, both of Calif., assignors to Robertshaw Controls Company, Richmond, Va.**

**Filed Mar. 13, 1974, Ser. No. 450,711**
**Int. Cl.² H02H 7/08**
**U.S. Cl. 317—42** **16 Claims**



11. A condition responsive control circuit comprising

a resistance bridge including first, second, third and fourth resistance arms connected at a pair of power input nodes and a pair of sensing nodes;

said first resistance arm containing a condition responsive resistance;

a diode bridge including first, second, third and fourth diodes connected at a pair of alternating current input nodes and a pair of unidirectional output nodes;

one of said pair of power input nodes of the resistance bridge and one of said pair of unidirectional output nodes of the diode bridge being connected together;

means including first and second lines for connecting to an alternating current source;

an alternating current responsive control relay having a winding electrically connected at one end to the first line and electrically connected at its other end to one of the pair of alternating current input nodes of the diode bridge;

the other of said pair of alternating current input nodes of the diode bridge being electrically connected to the second line;

unidirectional semiconductor switch means connected between the pair of unidirectional output nodes of the diode bridge;

means connecting the other of the pair of power input nodes of the resistance bridge to the first line;

voltage responsive means connected to the sensing nodes of the resistance bridge for operating the unidirectional semiconductor switch means when a predetermined condition is sensed by the condition responsive resistance;

said unidirectional semiconductor switch means including a PNPN semiconductor which has anode and cathode elec-

trodes with a gate electrode responsive to a current therethrough for triggering undirectional avalanche current flow between the anode electrode and the cathode electrode; and

said voltage responsive means including a semiconductor device which produces a pulsed unidirection output when the voltage across the sensing nodes exceeds a predetermined polarity, and filter means for filtering the pulsed unidirection output of the semiconductor device to apply a filtered signal to the gate electrode of the PNPN semiconductor.

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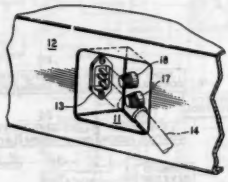
**3,965,397**

## MEANS FOR PREVENTING AN ELECTRICAL SHOCK HAZARD

**George David Pearsall, Jr., Middletown, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed May 1, 1975, Ser. No. 573,428**
**Int. Cl.² H02B 1/18**
**U.S. Cl. 317—116** **3 Claims**




1. A safety arrangement for electrically powered apparatus, said apparatus having at least two surfaces having regions that are substantially planar, each region having an orientation corresponding to one of two planes that intersect forming a dihedral angle, the arrangement comprising disengagable electrical connecting means mounted to one of said regions for powering said apparatus, fusing means mounted to the other of said regions and being in circuit with said connecting means, and said connecting means and said fusing means being mounted in close proximity to each other and the dihedral angle having a predetermined value such that said connecting means directly blocks withdrawl of said fusing means, to said fusing means is obstructed by said connecting means making disengagement of said electrical connecting means necessary to gain access to said fusing means, thereby insuring that said apparatus is disconnected from a powering potential before said fusing means is contacted.

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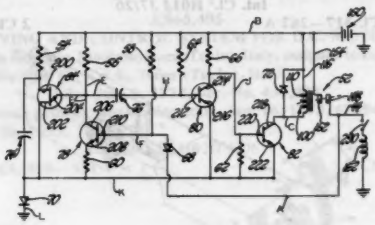
**3,965,398**

## INTERMITTENT LOAD ENERGIZER ASSEMBLY AND CIRCUIT MEANS

**Gerald K. Miller, Hersey, Mich., assignor to Nartron Corporation, Reed City, Mich.**

**Filed July 25, 1974, Ser. No. 491,763**
**Int. Cl.² H03H 7/30**
**U.S. Cl. 317—141 S** **13 Claims**

1. A flasher system for intermittently supplying electrical energy from a source of electrical potential to related electrical load means, comprising timing circuit means, said timing circuit means comprising first semiconductor means effective for creating an intermittent electrical timing signal, second semiconductor means, relay means, electrical contact means the opening and closing of which is controlled by said relay means, said second semiconductor means being adapted to be intermittently placed into a conductive state and a non-conductive state in response to the presence and absence of said timing signal, said second semiconductor means being effective when in one of said states to supply current flow from said source to said relay means, and said electrical contact means being effective when closed to supply current flow from said source to said related electrical load means, and additional semiconductor means having a plurality of electrical terminals, said additional semiconductor means being electrically connected to said timing circuit means and having at least one of said plurality of electrical terminals being adapted for con-



nection to related load circuit means containing said related electrical load means so as to be effective to cause said timing circuit means to be conductive or non-conductive depending upon whether there is the presence of an actual electrical load in said related load circuit means.

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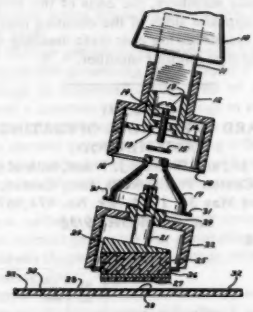
**3,965,399**

## PUSHBUTTON CAPACITIVE TRANSDUCER

**Frank A. Walker, Jr., and John B. Shevlin, both of c/o Controls Research Corporation, 2100 S. Fairview, Santa Ana, Calif. 92704**

**Filed Mar. 22, 1974, Ser. No. 453,841**
**Int. Cl.² H01G 5/01**
**U.S. Cl. 317—249 R** **7 Claims**



1. In a pushbutton transducer of the class above described, the combination comprising:

a reciprocable shaft including one end adapted to serve as an actuator therefor;

a resilient pad disposed on the other end of said shaft;

a pair of conductive electrode members, each having a terminal and being separated by a gap;

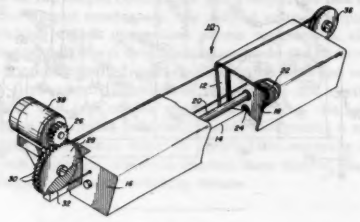
a flexible sheet electrode bridging means deformable across the plane thereof disposed on the end of said pad to be conformly deformed over the opposing surfaces of said electrode members for matingly interfacing a lower surface of said sheet electrode bridging means to said opposing surfaces of said electrode members, said flexible sheet electrode bridging means lower surface deforming to the contour of said opposing surfaces of said electrode members when said shaft is articulated against said electrode members; and

biasing means provided to urge the other end of said shaft away from said electrode members.

## 3,965,400
## CORONA GENERATING DEVICE WITH IMPROVED BUILT-IN CLEANING MECHANISM

**Peter M. Tolliver, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Feb. 24, 1975, Ser. No. 552,476**
**Int. Cl.² H01J 37/26**
**U.S. Cl. 317—262 A** **2 Claims**



**1.** An improved cleaning mechanism for a corona generating device, the device having an elongated generally U-shaped shield and a corona wire mounted within and extending along the shield, wherein the improvement comprises:

a. cleaning means in contact with the corona wire and slidably mounted within the shield so as to be movable along the latter;

b. a first circular member rotatably mounted on one end of the device and a second circular member rotatably mounted on the other end of the device, means forming a recess around the periphery of each of the circular memebers, and means forming gear teeth around the periphery of the first member on each side of the recess therein;

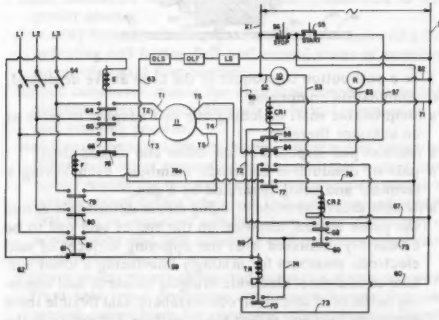
c. a length of belt mounted in and supported by the recesses of the cirular members, the ends of the belt being connected to opposite sides of the cleaning member; and

d. drive gear means having gear teeth meshing with the gear teeth of the first circular member.

## 3,965,401
## TEXTILE CARD CRUSH ROLL OPERATING SYSTEM AND METHOD

**Louis L. Jones, Jr., and William J. Wood, both of Canton, Ga., assignors to Canton Textile Mills, Inc., Canton, Ga.**

**Filed May 31, 1974, Ser. No. 474,967**
**Int. Cl.² B65H 59/38**
**U.S. Cl. 318—6** **7 Claims**

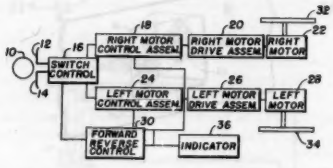


**1.** A textile card crush roll operating system comprising a crush roll driving motor operable both at slow and at high speeds, starting control means for energizing said motor so as to cause it to operate at low speed, electric timing means actuated independently of the crush rolls in coordination with actuation of said starting control means to initiate a timing cycle, operating control means activated upon completion of said timing cycle for causing said motor to operate at high speed, and automatic stop control means responsive to normal operating tension of sliver supplied from the crush rolls for rendering said operating control means effective and for deactivating said operating control means in response to subnormal sliver operating tension.

## 3,965,402
## HEADREST PROPORTIONAL CONTROL FOR MOTORIZED WHEELCHAIR

**Douglas H. Mogle, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed July 1, 1974, Ser. No. 484,383**
**Int. Cl.² H02P 7/68**
**U.S. Cl. 318—55** **12 Claims**




**1.** A head controlled mechanism and system for the proportional control of a driven device comprising:

a. switch control circuit means having a plurality of switch means and a two part movable headrest means for engaging the head of an operator for actuating said switch means to provide output voltage signals in response to movement of said movable headrest,

b. control circuit means coupled to said switch control circuit means for producing a variable duty cycle output control signal proportional to the voltage signals received from said switch control circuit means,

c. a driven device coupled to said control circuit means and being driven in a direction and at speeds controlled by movement of said movable headrest means.

## 3,965,403
## CONSTANT POWER CONTROL OF A D.C. ELECTRIC MOTOR FOR HANDLING CARGOES

**Chihiro Okado, Fuchu, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Japan**

**Filed Aug. 23, 1974, Ser. No. 500,086**
**Claims priority, application Japan, Aug. 24, 1973, 48-94933; Aug. 24, 1973, 48-94935**
**Int. Cl.² H02P 7/16**
**U.S. Cl. 318—143** **6 Claims**

**1.** A constant power control for a D.C. electric motor comprising a Ward-Leonard set including a variable D.C. voltage supply and a D.C. motor connected thereto comprising:

means for sensing the armature current of the motor,

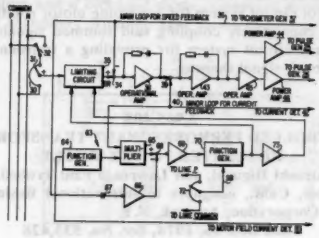
means for sensing the magnetic flux in the motor field winding,

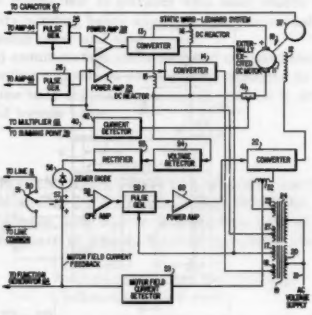
means for sensing the rate of change of motor speed,

means for generating a load torque signal in accordance with the armature current of the motor, a magnetic flux in the motor field winding and the rate of change of motor speed,

means connecting the load torque signal to the variable

D.C. voltage supply to control the variable D.C. voltage supply to maintain the motor armature current or the





motor field current at a preset constant value upon completion of motor acceleration.

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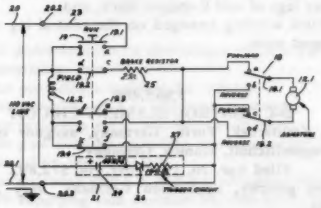
**3,965,404**

## APPARATUS AND METHOD OF BRAKING A UNIVERSAL MOTOR FOR OPERATING A COMPACT WINCH

**Paul S. Petersen, Minnetonka, Minn., assignor to Cordem Corporation, Minneapolis, Minn.**

**Filed Aug. 17, 1973, Ser. No. 389,330**
**Int. Cl.² H02P 3/14**
**U.S. Cl. 318—261** **20 Claims**



**1.** In a universal motor having the field and armature windings connected in series;

means producing dynamic braking of the armature and including

switching means disconnecting the windings from the current supply line and reversing connections to the armature winding to effectively cause the motor to act as a generator, the switching means also connecting a low braking resistance across the series connected field and armature windings; and

a current source connected to the field winding independently of the armature winding and rendered operative by the switching means to supply a pulse of current through the field winding when the supply line is disconnected from the windings by the switching means.

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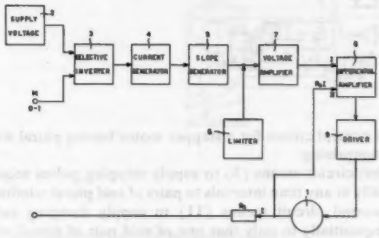
**3,965,405**

## DRIVING AND CONTROL SYSTEM FOR D.C. MOTORS

**Carlo Romano, Montalto Dora (Turin), Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy**

**Filed Jan. 9, 1974, Ser. No. 431,908**
**Claims priority, application Italy, Jan. 16, 1973, 67054/73; Oct. 16, 1973, 70040/73**
**Int. Cl.² H02D 5/06**
**U.S. Cl. 318—331** **5 Claims**



**1.** A driving and control circuit for a D.C. motor comprising in combination:

a direct current motor of the type including a permanent magnet and with an ironless rotor winding capable of continuous rotation in both directions, the rotation speed of the motor being proportional to said direct current supplied to it;

a constant voltage generator responsive to a two level command signal for generating at its output a constant positive voltage in response to one level of said command signal and a constant negative voltage in response to the other level of said command signal;

a constant current generator comprising a first operational amplifier connected to the output of said constant voltage generator, responsive to said positive and negative voltages;

a reference voltage generator means connected to said constant current generator, for generating a substantially trapezoidally shaped reference voltage, with a rising slope and a falling slope;

an impedance means, connected in series with said motor and ground, for developing a feedback voltage proportional to the speed of said motor;

an inverting operational amplifier connected to said reference voltage generator for inverting said reference voltage;

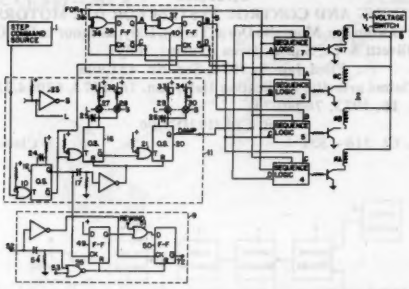
a second operatonal amplifier connected to said inverting amplifier, having an inverting input, a non-inverting input and an output, for adding said feedback voltage, applied from said impedance means to said non-inverting input, to said reference voltage, applied from said reference voltage generator means to said inverting input, to establish a positive feedback summation signal for compensating for variations in the speed of said motor; and

a pair of complementary transistors connected between said output and said motor, responsive to said positive feedback summation signal, for feeding over to said motor, for starting and stopping said motor in the presence of said rising and falling slopes respectively and, regulating the speed of said motor to be undisturbed by variations in load torque and inertia effects.

## 3,965,406
## STEPPING MOTOR DAMPING CIRCUIT

Robert E. Yablonski, Orange, Calif., assignor to Electronic Engineering Company of California, Santa Ana, Calif.

Filed Mar. 8, 1974, Ser. No. 449,575
Int. Cl.² G05B 19/40
U.S. Cl. 318—696 4 Claims



1. A control circuit for a stepper motor having plural windings, comprising:

a. first circuit means (3) to supply stepping pulses sequentially at any time intervals to pairs of said plural windings,

b. second circuit means (11) to supply damping pulses sequentially to only that one of said pair of plural windings just previously energized by the last one of said stepping pulses

for stopping the motor at each step,

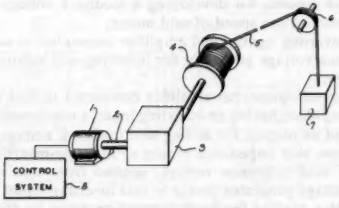
said second circuit means (11) having relaxation elements connected to said control circuit for altering the duration of said damping pulses inversely according to the repetition rate of said stepping pulses, and

c. third circuit means (7) having gating elements connected to said relaxation elements, to apply said damping pulses to the last previously energized winding during each step of said stepper motor.

## 3,965,407
## METHOD AND MEANS FOR MEASURING THE TORQUE DELIVERED BY AN ELECTRIC MOTOR

Thomas A. Stoner, Brookfield, Wis., assignor to Bucyrus-Erie Company, South Milwaukee, Wis.

Division of Ser. No. 332,697, Feb. 15, 1973, Pat. No. 3,867,678. This application Sept. 12, 1974, Ser. No. 505,529
Int. Cl.² H02P 5/00
U.S. Cl. 318—432 3 Claims




1. In a motor control, the combination comprising:

means providing an electrical signal indicative of the speed of a motor being controlled;

a differentiating circuit in receiving relation to said speed indicative signal that generates a signal indicative of rate of change of speed to provide an acceleration torque signal;

a motor current sensing circuit that generates a signal indicative of induced torque of a motor being controlled;

means for coupling said motor current sensing circuit to said differentiating circuit to sum said acceleration torque signal and said induced torque signal;

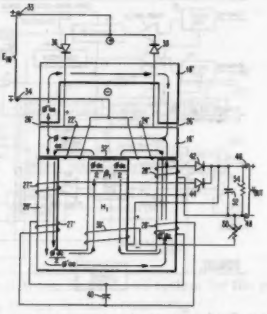
a control circuit system for governing motor rotation; and

means capacitively coupling said summed signals to said control circuit system for providing a transient torque feedback signal thereto.

## 3,965,408
## CONTROLLED FERRORESONANT TRANSFORMER REGULATED POWER SUPPLY

Hobart Atsushi Higuchi, and Lawrence Paul Trubell, both of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 16, 1974, Ser. No. 533,428
Int. Cl.² H01F 27/38; G05F 1/48, 1/64
U.S. Cl. 321—25 11 Claims



1. A controlled ferroresonant transformer for a regulated power supply circuit arrangement comprising

a ferromagnetic electric transformer core comprising an E-shaped stack of laminations, and I-shaped stack of laminations and a C-shaped stack of laminations,

a primary winding arranged on said I-shaped stack with said C-shaped stack adjacent and spaced by an air gap for imparting the effect of a filter choke,

a secondary winding comprising two coils arranged on the outer legs of said E-shaped stack with the E-shaped stack adjacent said I-shaped stack and spaced by an air gap,

a resonating winding comprising two coils arranged on the outer legs of said E-shaped stack, and

a control winding arranged on the central leg of said E-shaped stack.

## 3,965,409
## D-C CONTROL ELEMENT CIRCUIT

Herwig Klautschek, Furth, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Apr. 30, 1975, Ser. No. 572,892
Claims priority, application Germany, May 20, 1974, 2424369
Int. Cl.² H02M 7/155
U.S. Cl. 321—45 C 8 Claims

1. A d-c control circuit for use with a d-c voltage source and a load comprising:

first and second connecting lines adapted to connect said source to said load, said first connecting line including a controllable main valve;

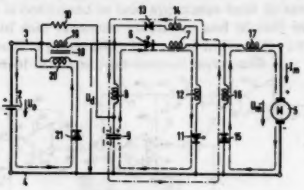
A quenching circuit branch for operating on said main valve including a commutation capacitor, a commutation choke and a controllable commutation valve connected in series, said quenching circuit being connected in paral-

lel with said main valve such that said commutation valve is in the blocking direction of said main valve;

a fly-back valve connected antiparallel to said main valve;

a bypass valve adapted to be connected parallel to said load

a transformer including a primary winding, a secondary winding and a blocking diode connected in series with said secondary winding, said series connection of said



blocking diode and said secondary winding being adapted to be connected in parallel with said source and said primary winding being adapted to be connected between said main valve and said source;

and said commutation valve and said commutation capacitor having a common connection connected to said second line such that said commutation valve is antiparallel to said bypass valve.

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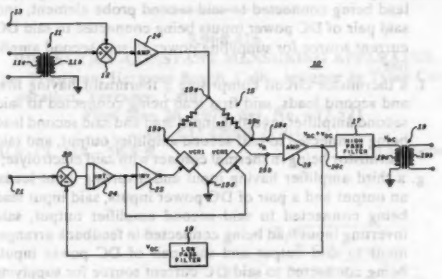
**3,965,410**

**A.C. POTENTIOMETER WITH BRIDGE HAVING VOLTAGE CONTROLLABLE DEVICES**

**Pierce C. Roselle, and Roy A. Zaborowski, both of Phoenix, Ariz., assignors to Sperry Rand Corporation, New York, N.Y.**

**Filed Aug. 11, 1975, Ser. No. 603,423**
**Int. Cl.² G05F 1/56**
**U.S. Cl. 323—19** **9 Claims**



1. An a.c. potentiometer for providing a variable a.c. output voltage comprising:

means for providing a variable d.c. voltage;

means for providing an a.c. reference excitation;

means for providing a d.c. reference excitation;

a variable gain network including an input means, control means and an output means;

means for summing said a.c. and d.c. reference excitations and for supplying said summed excitations to said network input means whereby a signal at said network output means includes both a.c. and d.c. voltage components;

means, responsive to said d.c. voltage component of said signal at said network output means and to said variable d.c. voltage, for supplying a d.c. error signal, said d.c. error signal coupled to said network control means for controlling the gain of said variable gain network to reduce said error signal to zero whereupon the gain of said variable gain network is directly proportional to said variable d.c. voltage whereby said a.c. component at said network output means is likewise directly proportional to said variable d.c. voltage; and

means, responsive to said signal at said network output means, for removing said d.c. component therefrom, thereby providing said variable a.c. output voltage.

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**3,965,411**

**GRADIENT WOUND TRIM COIL FOR TRIMMING A PRIMARY PICKUP COIL**

**Victor W. Hesterman, Palo Alto, Calif., assignor to Develco, Inc., Mountain View, Calif.**

**Filed Jan. 21, 1974, Ser. No. 434,857**
**Int. Cl.² G01R 33/02**
**U.S. Cl. 323—44 F** **7 Claims**

1. In a superconductive magnetic sensor:

superconductive primary pickup coil circuit means for sensing a component of magnetic field or gradient of a magnetic field in which said primary pickup coil circuit means is disposed by picking up a magnetic flux proportional to the sensed magnetic field or magnetic field gradient component;

an auxiliary superconductive trim coil circuit means wound in a magnetic gradient pickup configuration disposed in said magnetic field common to said primary pickup coil circuit means for picking up a trim magnetic flux proportional to a gradient of the magnetic field in which said trim coil circuit means is immersed;

sensor means electromagnetically coupled to said primary pickup coil means and to said trim coil means for combining magnetic flux picked up by both said primary pickup coil circuit means and said trim coil circuit means to derive an output proportional to the combined magnetic flux picked up by said primary pickup coil circuit means and by said trim coil circuit means; and

means for producing a variable localized gradient in the common magnetic field in which said trim coil means is immersed while said auxiliary and primary coil circuit means are superconducting to effect a variable change in the trim magnetic flux coupled into said sensor means.

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**3,965,412**

**DETERMINATION OF THE POLARITY OF REMANENT MAGNETIZATION OF AN EARTH FORMATION PENETRATED BY A BORE HOLE USING AN ACCURATE MAGNETOMETER**

**Sulhi H. Yungul, Fullerton, Calif., assignor to Chevron Research Company, San Francisco, Calif.**

**Filed July 29, 1974, Ser. No. 492,639**
**Int. Cl.² G01V 3/00, 3/18**
**U.S. Cl. 324—8** **11 Claims**

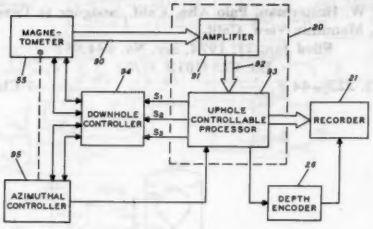
1. A method of detecting at least the polarity of the direction of remanent magnetization associated with a rock source within an earth formation traversed by a well bore which comprises:

a. fixedly positioning, depthwise, in said well bore magnetometer means defining an axis of response substantially orthogonal to the normal geomagnetic field of the earth

at a known mapping depth in a selected azimuthal direction of repose;

b. energizing said magnetometer means;

c. azimuthally rotating said magnetometer means so as to provide a series of readings, each of which sensing a component of said remanent magnetization normal to the earth's field in a known azimuthal direction;




d. comparing the intensities of said azimuthally related readings to indicate a maximum and determining therefrom at least the polarity of direction of said remanent magnetization of said rock source at said known mapping depth.

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**3,965,413**

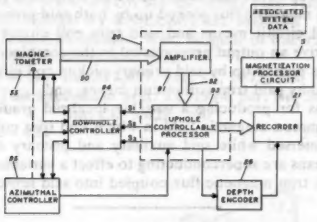
## DETERMINATION OF THE POLARITY OF REMANENT MAGNETIZATION OF AN EARTH FORMATION PENETRATED BY A BORE HOLE USING A HIGHLY ACCURATE MAGNETOMETER FOLLOWED BY PROCESSING OF RESULTING AS WELL AS ASSOCIATED DATA

**Sulhi H. Yungul, Fullerton, Calif., assignor to Chevron Research Company, San Francisco, Calif.**

**Filed July 29, 1974, Ser. No. 492,638**

**Int. Cl.² G01V 3/00, 3/18**

**U.S. Cl. 324—8** **7 Claims**




1. A method of indicating the polarity of the direction of remanent magnetization associated with an earth formation in a well bore penetrating said formation which comprises:

a. estimating by means of the published paleomagnetic data a direction S which is approximately in the direction of remanent magnetization at depth of interest (z);

b. positioning in said well bore magnetometer means defining an axis of response substantially coextensive with and parallel to the direction S at said mapping depth; and

c. measuring the intensity of magnetic field HS (z) in said earth formation in said direction S and obtaining therefrom an indication of remanent magnetization of said formation at said depth of interest z, wherein HS is the total contribution from the remanent and induced magnetizations of the formations adjacent to the well bore.

**3,965,414**

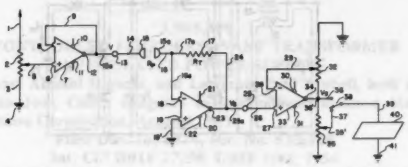
## TEMPERATURE COMPENSATED CONDUCTIVITY MEASURING SYSTEM

**Horace A. Teass, Jr., 73 Remson St., Brooklyn, N.Y. 11201**

**Continuation of Ser. No. 441,953, Feb. 13, 1974, abandoned. This application May 29, 1975, Ser. No. 581,816**

**Int. Cl.² G01N 27/42**

**U.S. Cl. 324—30 R** **6 Claims**



1. An automatic temperature compensated system for measuring and linearly indicating the conductivity of an electrolyte comprising:

a. a regulated AC current source;

b. a first amplifier having input and inverting input leads, an output and a pair of DC power inputs, said input being electrically connected to said regulated AC current source, and said inverting input lead being electrically connected in feedback arrangement to said output;

c. a DC current source connected to said pair of DC power inputs for supplying power to said first amplifier;

d. a conductivity probe having first and second probe elements for immersion into an electrolyte whose conductance is to be measured, said first probe element being electrically connected to said first amplifier output;

e. a second amplifier having input and inverting input leads, an output and a pair of DC power inputs, said input lead being connected to circuit common, said inverting input lead being connected to said second probe element, and said pair of DC power inputs being connected to said DC current source for suppyling power to said second amplifier;

f. a thermistor circuit comprising a thermistor having first and second leads, said first lead being connected to said second amplifier inverting input lead and said second lead being connected to said second amplifier output, and said thermistor being in thermal contact with said electrolyte;

g. a third amplifier having input and inverting input leads, an output and a pair of DC power inputs, said input lead being connected to said second amplifier output, said inverting input lead being connected in feedback arrangement to said output and said pair of DC power inputs being connected to said DC current source for supplying power to said third amplifier; and

h. measuring means connected between said third amplifier output and circuit common for measuring any electrical output from said third amplifier.

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**3,965,415**

## ALTERNATING VOLTAGE METHOD OF ELECTRICALLY DETECTING DAMAGE TO AN ENAMEL LAYER HAVING ONE OR MORE TANTALUM PLUGS

**Rudolf Ehret, Schwetzingen, Germany, assignor to Pfaudler-Werke AG, Schwetzingen, Germany**

**Filed Mar. 24, 1975, Ser. No. 561,227**

**Claims priority, application Germany, Mar. 29, 1974, 2415317**

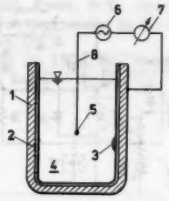
**Int. Cl.² G01R 31/12**

**U.S. Cl. 324—54** **1 Claim**

1. Method of electrical detection of faults in an anticorrosion enamel layer of a metallic structure of an apparatus containing an electrically conducting medium and provided with at least one tantalum plug, comprising:

providing an insulated tantalum electrode in said medium in electrical contact therewith together with connection means, insulated from said apparatus, for connecting said tantalum electrode to a potential source external to the portion of said apparatus containing said medium;

applying a low voltage alternating potential between said tantalum electrode and said metallic structure while said medium is contained in said apparatus both to assure the coating of said tantalum electrode and of said tantalum plug(s) with a passivating layer and to furnish current for detection of faults in said enamel layer, and




measuring the current flow produced by said application of potential after said tantalum electrode and said tantalum plug(s) have been coated with said passivating layer, thereby to determine the presence of a fault in said enamel layer,

the frequency of said alternating potential being chosen so as to favor measurement of said current flow without substantial interference from extraneous electric-current-inducing fields.

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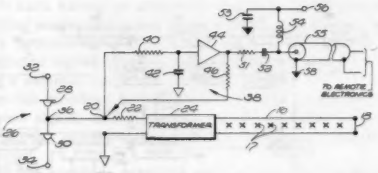
**3,965,416**

## DIELECTRIC-CONSTANT MEASURING APPARATUS

**Jay Friedman, Hermosa Beach, Calif., assignor to Tylan Corporation, Torrance, Calif.**

**Filed May 28, 1974, Ser. No. 473,521**
**Int. Cl.² G01R 27/04**
**U.S. Cl. 324—58.5 B** **13 Claims**




1. Apparatus for the measurement of the dielectric constant of a substance, comprising:

a driver device, including a tunnel diode operating to change the state of said device, said device actuable by applied pulses to reverse states and thereby provide drive pulses;

a sensor for placement contiguous to said substance, said sensor being connected to receive drive pulses from said driver device and including a transmission line terminated to provide reflections of received pulses related in time to the dielectric constant of said substance, said reflections being applied as pulses to said driver device; and

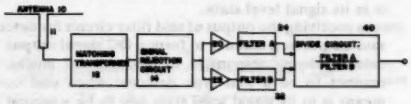
means for manifesting the time relationship between said pulses and reflections to indicate said dielectric constant.

**3,965,417**

## COHERENT COMPONENT MAGNITUDE DETECTOR

**Donald R. Tompkins, Laramie, Wyo., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed June 26, 1975, Ser. No. 590,667**
**Int. Cl.² G01R 23/16**
**U.S. Cl. 324—77 R** **4 Claims**




1. A method of determining the existence of a coherent component of an unspecified signal comprising:

a. receiving an unspecified signal;

b. rejecting any unwanted frequency of the unspecified signal to provide a retained signal and a rejected signal;

c. splitting the retained signal into a first and second part;

d. passing said first part thru a first filter having a selected center frequency and an established quality factor to provide a first filter output signal;

e. passing said second part thru a second filter having a center frequency identical to said first filter and an established quality factor different from said first filter to provide a second filter output signal;

f. dividing said first filter output signal by said second filter output signal to provide a final signal indicative of the magnitude of the coherent component of the unspecified signal at the selected center frequency.

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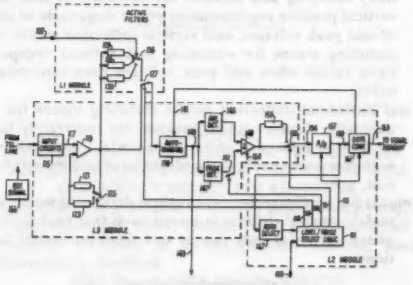
**3,965,418**

## TELEPHONE SYSTEM TESTING APPARATUS AND TECHNIQUES UTILIZING CENTRAL MEASURING EQUIPMENT WITH A PLURALITY OF REMOTE TEST STATIONS

**Paul R. Bauer, Palo Alto, and Duane E. Dunwoodie, Los Altos, both of Calif., assignors to Wiltron Company, Palo Alto, Calif.**

**Division of Ser. No. 411,818, Nov. 1, 1973, Pat. No. 3,890,495.**
**This application Mar. 6, 1975, Ser. No. 555,727**
**Int. Cl.² G01R 17/04, 15/08**
**U.S. Cl. 324—99 D** **8 Claims**




1. An electronic circuit for selectively measuring either signal level or noise level from a communication circuit, comprising:

a single visual display device,

an input for connection to said communication circuit under test,

control means responsive to a control input for establishing either signal level or noise level states,

an amplifier responsive to the input, said amplifier being switchable between two distinct amplification levels and

connected to said control means to have a different amplification when said control means is in its noise state than when said control means is in its signal level state,

a filter circuit for modifying the frequency response of the amplified signal, said filter circuit being switchable between at least two different frequency response curves in response to the state of said control means, said filter circuit having a different bandwidth when said control means is in its noise state than when said control means is in its signal level state,

means receiving the output of said filter circuit for detecting said output in a manner to form a DC signal output, said detector being responsive to said control means in a manner to be a first type detector when said control means is in its signal level state and to be a second type detector when said control means is in its noise state, and

means receiving the DC output of said detector for driving said single visual display.

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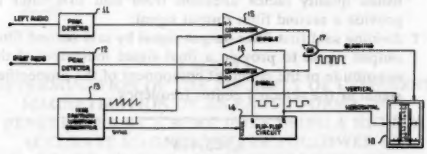
**3,965,419**

## CATHODE RAY TUBE METERS

**Micheal O. Paiva, Binghamton, N.Y., assignor to McIntosh Laboratory Inc., Binghamton, N.Y.**

**Filed July 18, 1974, Ser. No. 489,477**
**Int. Cl.² G01R *13/28, 19/04***
**U.S. Cl. 324—121 R** **9 Claims**



1. A cathode ray tube indicator system for displaying the amplitude of continuously varying peak audio signal levels which are in separate stereo channels, comprising

a cathode ray tube,

said cathode ray tube including vertical and horizontal deflection means, a source of a cathode ray, and a luminous display screen,

plural stereo channels each conveying an audio signal,

separate means for peak detecting each of said audio signals to provide peak voltages,

said vertical deflection means including means for sequentially sweeping said cathode ray vertically at least to a vertical position representative of the magnitude of each of said peak voltages, said vertical deflection means also including means for extending said vertical sweeps to finite values when said peak voltages have zero magnitudes,

said horizontal deflection means including means for sequentially displacing said cathode ray recurrently horizontally to a plurality of fixed horizontal locations representative respectively of the identities of said stereo channels, and

means for synchronizing said vertical deflection means and said horizontal deflection means such that each vertical sweep occurs at only one of said fixed horizontal locations.

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**3,965,420**

## APPARATUS FOR NON-DESTRUCTIVELY TESTING THE VOLTAGE CHARACTERISTICS OF A TRANSISTOR

**Wilfred Potter Bennett, Belle Mead, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Dec. 16, 1974, Ser. No. 533,346**
**Int. Cl.² G01R *31/22***
**U.S. Cl. 324—158 T** **9 Claims**

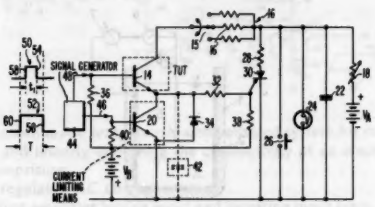
1. An apparatus for testing the voltage characteristics of a transistor having a pair of main electrodes and a control electrode, said transistor being of a type tending to conduct a destructive certain current when the voltage at the main electrode exceeds a given level, the apparatus comprising:

settable current limiting means having a current limiting value settable anywhere in a given range,

means for connecting one of said main electrodes to said current limiting means,

means for applying a test voltage across the serially connected main electrodes and current limiting means,

said current limiting means being responsive to a control signal having a predetermined value applied as an input



thereto for setting the current limiting value of said current limiting means within said range to thereby result in a potential increase at said one main electrode when said certain current occurs at said main electrodes,

preprogrammed signal generating means coupled to said current limiting means for determining the value of said control signal and for applying said control signal to said current limiting means, and

voltage sense means responsive to said potential increase at said one main electrode for removing the test voltage from said main electrodes.

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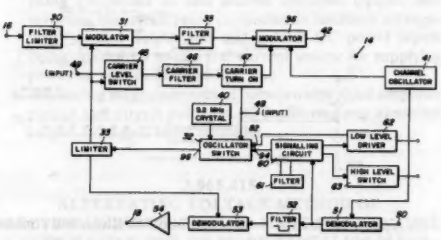
**3,965,421**

## AUTOMATIC MASTER-SLAVE CARRIER SWITCHING CIRCUIT

**Wayne Joseph Bates, Des Plaines, Ill., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Dec. 19, 1974, Ser. No. 534,537**
**Int. Cl.² H04B *1/38***
**U.S. Cl. 325—17** **8 Claims**



6. In a suppressed carried, communications system including at least two, spaced apart, transmitter-receivers wherein a portion of the carrier is transmitted for use as a synchronizing signal, the method of switching between master and slave carriers comprising the steps of:

a. generating a local carrier;

b. generating a local control signal when the local transmitter is operated and no signal is being received;

c. generating a remote control signal when a signal including a remote carrier when a signal is received and the local transmitter is not operating;

d. separating the remote carrier from the received signal;
e. utilizing the local carrier for a synchronizing signal in the local transmitter-receiver either with no control signals present or in response to the generation of a local control signal; and
f. utilizing the remote carrier for a synchronizing signal in the local transmitter-receiver in response to the generation of a remote control signal.

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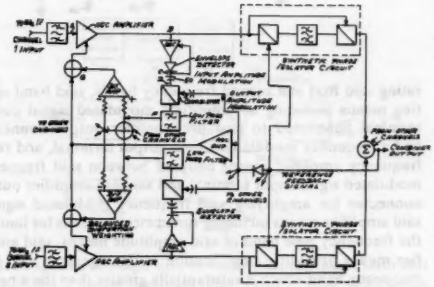
3,965,422

## SYSTEM CHANNEL DISTORTION WEIGHTING FOR PREDETECTION COMBINERS

**Olindo A. Tagliaferri, Rome, N.Y., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed July 26, 1974, Ser. No. 492,077**
**Int. Cl.² H04B 7/02**
**U.S. Cl. 325—305** **1 Claim**



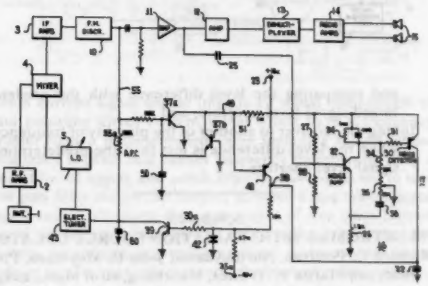
1. A system channel distortion weighting apparatus for predetection combiners comprising in combination:
a plurality of diversity receiver channels respectively providing a plurality of I.F. signals, said plurality of diversity receiver channels each having a level control means connected thereto to control signal level within each receiver channel, said plurality of diversity receiver channels each having an amplitude distorted signal therein,
summing means connected to each of said plurality of diversity receiver channels to sum each of said amplitude distorted signals therefrom, said summing means providing a summed amplitude distorted signal,
means for envelope detecting said summed amplitude distorted signal, said detecting means providing a signal envelope representative of the distorted amplitude thereof,
means for envelope detecting each of said amplitude distorted signals thereby providing a plurality of signal envelopes representative of the amplitude distortion in each of said signals, and
means for correlating said distorted signal envelope of said summed signal with each of said plurality of amplitude distorted signal envelopes to provide an output voltage, said output voltage being proportional to the correlation between each of said amplitude distorted signal envelopes and said distorted signal envelope of said summed signal, control signal means producing means providing a level control signal in response to said output voltage, said level control signal being applied to each of said level control means, said level control means adjusting each diversity receiver channel gain in response to said level control signal.

3,965,423

## AUTOMATIC FREQUENCY CONTROL SYSTEM

**Lawrence W. Fish, Jr.; Ronald C. Evans, and Sidney A. Corderman, all of Binghamton, N.Y., assignors to McIntosh Laboratory Inc., Binghamton, N.Y.**

**Filed July 17, 1974, Ser. No. 489,123**
**Int. Cl.² H04B 1/28**
**U.S. Cl. 325—346** **6 Claims**



3. In a superheterodyne receiver, a local oscillator for establishing the tuned frequency of said receiver, a circuit responsive to detuning of said local oscillator for developing a bipolar a.f.c. voltage having an amplitude which is a function of the extent of said detuning, a first NPN transistor having a first base, first emitter and first collector, a second NPN transistor having a second base, second emitter and second collector, means connecting said first base and said second emitter to a point of said a.f.c. circuit, means grounding said first emitter and said second base, means applying dc supply voltage to said first and second collectors, means responsive to turning on of either of said transistors for grounding a second point of said a.f.c. circuit, and means substantially isolating said first point from said second point in respect to voltage variations.

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3,965,424

## METHOD AND APPARATUS FOR TRACKING AN INCREMENTALLY SWEEPING GENERATOR BY A FREQUENCY SELECTIVE RECEIVER

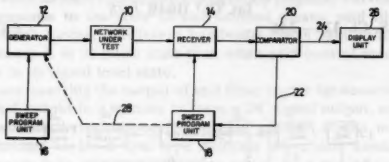
**Robert Coackley; John Reid Urquhart, both of Dalgety Bay, by Dunfermline, and David George Dack, Dunfermline, all of Scotland, assignors to Hewlett-Packard Limited, South Queensferry, Scotland**

**Filed Dec. 4, 1974, Ser. No. 529,673**
**Claims priority, application United Kingdom, Dec. 21, 1973, 59599/73**
**Int. Cl.² H04B 17/00**
**U.S. Cl. 325—363** **7 Claims**

1. A method of tracking a sweeping generator with a frequency selective receiver tunable to a plurality of frequencies comprising the steps of:
receiving and measuring the level of a signal with the receiver by making at least two successive level measurements at one frequency to which the receiver is tuned;

providing a predetermined reference signal condition by establishing a predetermined signal level aperture;

comparing the measured signal against the predetermined reference signal condition by determining the level difference between two of the successive level measurements




and comparing the level difference with the predetermined signal level aperture; and

tuning the receiver to another of the plurality of frequencies when the level difference is less than the predetermined signal level aperture.

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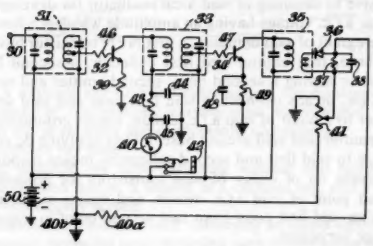
**3,965,425**

## ELECTROMAGNETIC RADIATION SOURCE LOCATOR

**Richard C. Peterson, North Adams; John D. Moynihan, Pittsfield, and Martin W. O'Shea, Manchaug, all of Mass., assignors to Sprague Electric Company, North Adams, Mass.**

**Filed Oct. 23, 1974, Ser. No. 517,266**
**Int. Cl.² H04B 1/00**
**U.S. Cl. 325—364** **5 Claims**



1. In an apparatus for locating the source of electromagnetic radiation of the type including a radio receiver that provides a d.c. signal whose amplitude is a function of the strength of the received radiation, the improvement comprising:

a voltage controlled audio oscillator (VCO) of the pulse generator type being connected to and controlled by said d.c. signal, said VCO having a pulse repetition rate of from 0.5 to 10 pulses per second when said strength of said received radiation is zero and said repetition rate increasing as a function of said received radiation strength, the output of said VCO being adapted for connection to an electro-acoustic transducer, for the purpose of producing a sound whose pitch increases with said received radiation strength.

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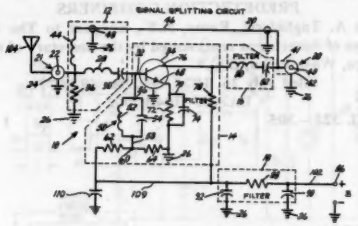
**3,965,426**

## FREQUENCY MODULATED SIGNAL PRE-AMPLIFIER WITH AMPLITUDE MODULATED SIGNAL BYPASS

**Robert S. Ringland, Burlington, Iowa, assignor to Tandy Corporation, Forth Worth, Tex.**

**Filed Jan. 10, 1974, Ser. No. 432,160**
**Int. Cl.² H04B 1/16**
**U.S. Cl. 325—375** **10 Claims**

1. For use with a radio receiver for receiving both frequency and amplitude modulated signals, said frequency modulated signals being in a first frequency band and said amplitude modulated signals being in a second frequency band different from said first frequency band, the receiver including an antenna, an antenna lead, a receiver input circuit and complementary electrical connectors affixed to said antenna lead and said receiver input circuit, respectively, for coupling the antenna lead to the receiver input circuit; a frequency modulated signal pre-amplifier comprising a pre-amplifier input connector adapted to engage said antenna lead connector and a pre-amplifier output connector for engaging said receiver input circuit connector, band splitting circuit means coupled to said pre-amplifier input connector for receiving and separating said first and second frequency bands, said band splitting means including an amplitude modulated signal output terminal connected to said pre-amplifier output connector and a frequency modulated signal output terminal, and radio frequency amplifier means coupled between said frequency modulated signal input terminal and said pre-amplifier output connector for amplifying said frequency modulated signals, said amplifier means including tuned circuit means for limiting the frequency pass band of said amplitude means, said amplifier means providing amplification to the signals in said first frequency band which is substantially greater than the amplification of the signals in said second frequency band.

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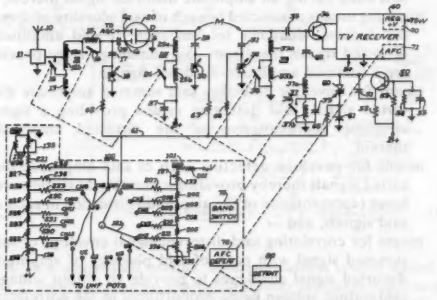
**3,965,427**

## TELEVISION TUNING SYSTEM WITH PRECISION SUBSTRATE SWITCH ASSEMBLY

**John Y. Ma, Glenview, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.**

**Filed Sept. 3, 1974, Ser. No. 502,482**
**Int. Cl.² H03J 5/02**
**U.S. Cl. 325—464** **17 Claims**




1. An electronic television tuner system without a fine tuning control, for receiving and translating television signals in a fixed frequency range, having a plurality of tunable stages, each including an abrupt junction varactor diode displaying a capacitance-to-tuning voltage characteristic which is predictable from diode to diode, and means supplying the varactor diodes with tuning voltages for tuning said tuner to individual television signals in said fixed frequency range comprising:

a source of regulated potential;

a substrate including a stable voltage divider network comprising deposited resistors whose junctions form voltage terminals at which respective ones of said tuning voltages are developed;

means on said substrate selectively connecting said voltage terminals to said tunable stages; and

setting means on said substrate coupled between said source and said voltage divider network for establishing the tuning voltage at one of said voltage terminals to enable reception and translation of a corresponding one of said television signals.

## 3,965,428

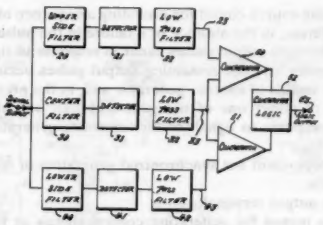
## SPECTRUM-SHAPE DISCRIMINATING ON/OFF TARGET INDICATOR

**Joel Katz, and James R. Pousson, both of Los Angeles, Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Jan. 4, 1971, Ser. No. 105,748**

**Int. Cl.² H04B *1/10***

**U.S. Cl. 325—474** **2 Claims**



1. A spectrum-shape discriminating on/off target indicator comprising a center bandpass filter, equal in bandwidth to the maximum spectral width of the desired signal, first and second contiguous narrow bandwidth filters, each of said filters receiving a common input signal, first, second and third detectors receiving the output of said first contiguous filter, said center filter, and said second contiguous filter, respectively, first, second and third low pass filters receiving the DC output of said first, second, and third detectors, respectively, first and second comparators, said first comparator receiving the output of said first and second low pass filter, said second comparator receiving the output of said second and third low pass filters, and a logic circuit receiving the outputs from said first and second comparator, said logic circuit rejecting sloping spectral shapes and envelopes approximating broad gaussian shapes and providing a DC logic output signal only for input signals having a signal-to-noise ratio equal to or higher than a preset minimum level though the signal "noise bandwidth" meets prescribed conditions.

## 3,965,429

## CIRCUITRY FOR USE WITH A TRANSDUCER WHICH GENERATES A SIGNAL CORRESPONDING TO A PHYSICAL PHENOMENON

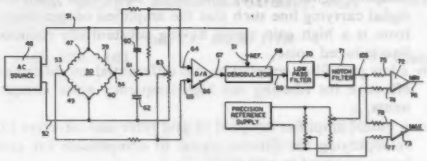
**Harry E. Roberts, III, Wilmington, Del., assignor to Columbia Research Laboratories, Inc., Woodlyn, Pa.**

**Continuation-in-part of Ser. No. 264,781, June 21, 1972, Pat. No. 3,858,443. This application May 17, 1974, Ser. No. 471,009**

**Int. Cl.² G01N *27/00*; G08B *19/00***

**U.S. Cl. 328—1** **5 Claims**

1. A circuit to be employed with a transducer which translates a mechanical motion into an alternating current electrical signal which includes a carrier frequency signal whose amplitude is representative of said motion, comprising in combination: amplifier means adapted to be connected to said transducer to receive said alternating current signal and to generate an amplitude sinewave-like signal whose amplitude represents a measure of said mechanical motion; signal demodulating means connected to said amplifier means to receive said sinewave-like signal and translate it into a pulsating direct current signal which pulsating direct current signal includes a component having twice the frequency of said carrier signal; low pass filter means connected to said signal demodulating means and formed to receive said pulsating



direct current signal and to impede all signal components of said pulsating direct current signal which have a frequency greater than a predetermined value including signals whose frequency is twice said carrier frequency thereby providing a once filtered signal; and notch filter means connected to said low pass filter means and formed to receive said once filtered signal and to attenuate that component of said once filtered signal which has a frequency of twice said carrier frequency thereby providing a non-pulsating direct current signal whose voltage level is a reliable measure of said mechanical motion.

## 3,965,430

## ELECTRONIC PEAK SENSING DIGITIZER FOR OPTICAL TACHOMETERS

**Arnold W. Brandt, Livonia, Mich., assignor to Burroughs Corporation, Detroit, Mich.**

**Continuation-in-part of Ser. No. 428,616, Dec. 26, 1973, abandoned. This application June 18, 1975, Ser. No. 587,992**

**Int. Cl.² H03K *5/08*; H03B *19/00*; G01P *3/36*; G01F *1/06***

**U.S. Cl. 328—20** **8 Claims**

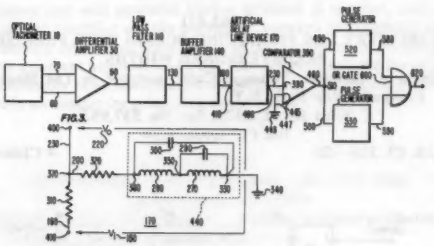


FIG.3.



1. The method of digitizing a signal from an optical tachometer comprising the steps of:

a. subtracting and amplifying a signal carrying line from a non-signal carrying line originating from the optical tachometer to thereby substantially remove line induced noise and to increase the gain of the subtracted signal,

b. filtering the subtracted signal to remove the remainder of said line induced noise,

c. reamplifying the filtered signal to recover any loss of gain incurred in said filter,

d. delaying the reamplified signal,

e. subtracting the delayed signal from the reamplified signal to thereby obtain a resultant signal that is uniformly delayed in time such that its zero amplitude points occur a fixed delay after the peak points of the reamplified signal,

f. alternating the level of a constant amplitude signal to create a digitized signal whenever the resultant signal intersects a reference level, said alternating occurring only when adjacent slopes of the resultant signal at the reference level intersection point are of opposite directions, and

g. doubling the frequency of the digitized signal by triggering on the positive and negative peaks thereof, thereby

causing frequency changes of the sinusoidal signal to be sensed on every slope direction change.

4. An improved system for digitizing a high frequency sinusoidal signal from an optical tachometer comprising:

a. a differential amplifier coupled to said optical tachometer by a signal carrying line and a non-signal carrying line, said non-signal carrying line being subtracted from the signal carrying line such that the amplified output therefrom is a high gain signal having substantially reduced line-induced noise,

b. a low pass filter coupled to said differential amplifier and effective for filtering out high frequency noise components,

c. a buffer amplifier coupled to said filter and effective for reamplifying the filtered signal to compensate for gain losses incurred in said filter,

d. an artifical delay line coupled to said buffer amplifier and effective for delaying the reamplified signal and for subtracting the delayed signal from the undelayed signal to thereby produce a uniformly delayed resultant signal through time such that the zero amplitude points thereof delayably concur just after the peak points of the reamplified signal,

e. a comparator coupled to said buffer amplifier and to said delay line and effective for digitizing said resultant signal when the slope direction thereof as sensed thereby is opposite the preceding one, said comparator being operative also to not digitize said resultant signal when the slope direction thereof is identical to said preceding one, and

f. a pair of pulse generators parallely coupled to said comparator and effective for trigger pulsing on the positive and negative peaks, respectively, of said resultant signal and for outputting signals to an OR gate to thereby effectively double the frequency of said original sinusoidal signal.

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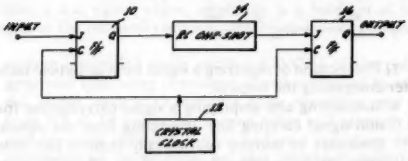
**3,965,431**

## CIRCUITRY FOR PRODUCING PULSES WITH PRECISE PREDETERMINED WIDTHS

**Edgar A. Johnson, Tujunga, Calif., assignor to The Singer Company, New York, N.Y.**

**Filed Jan. 2, 1975, Ser. No. 537,983**
**Int. Cl.² H03K 5/04**
**U.S. Cl. 328—58** **4 Claims**




1. Circuitry for generating a pulse of precise predetermined width in response to an input signal comprising:

a clock-pulse generator;

a one-shot multivibrator, said multivibrator being adjustable to approximately the desired predetermined pulse width;

input means coupled to said generator and to said multivibrator, said input means being responsive to an input trigger signal for applying an actuating pulse to said multivibrator upon the occurrence of the first clock pulse after receipt of said triggering signal; and

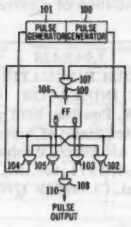
output means coupled to said clock pulse generator and to said multivibrator for generating an output pulse that initiates upon the occurrence of said multivibrator actuating pulse and which terminates upon the occurrence of the first clock pulse after completion of said multivibrator pulse.

**3,965,432**

## HIGH RELIABILITY PULSE SOURCE

**Jeffrey Neil Denenberg, Naperville, and Kenneth Peter May, Aurora, both of Ill., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Apr. 14, 1975, Ser. No. 567,728**
**Int. Cl.² H03K 1/12**
**U.S. Cl. 328—61** **5 Claims**




1. A pulse source circuit for providing a sequence of output pulses wherein, in the absence of a failure in the pulse source circuit, alternate output pulses occur in response to signals of one generator and the remaining output pulses occur in response to signals of another generator and, in the presence of a failure of either one of the generators, all output pulses occur in response to signals of the remaining generator comprising:

two independent but synchronized generators of repetitive signals;

a pulse output terminal;

bistable means for generating control signals at first and second output terminals in response to control signals at a control input terminal;

first gating means having input terminals connected to said generators and to said first and second output terminals of said bistable means for providing at said pulse output terminal a sequence of pulses in response to output signals of said generators and to said control signals; and

second gating means having input terminals connected to said generators and to said first and second output terminals of said bistable means for generating signals at said control input terminal for controlling the states of said bistable means in response to output signals of said generators and to said control signals.

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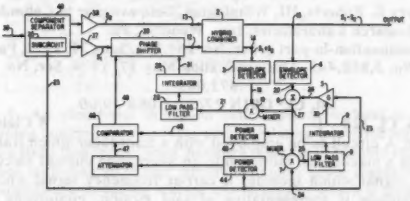
**3,965,433**

## PHASE EQUALIZER USEABLE IN A LIND AMPLIFIER

**Yu Shuan Yeh, Freehold Township, Monmouth County, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Mar. 27, 1975, Ser. No. 562,572**
**Int. Cl.² H03B 3/04**
**U.S. Cl. 328—155** **6 Claims**




6. A linear amplifier of the type having a component separator for producing from an input signal two signal components

and the envelope of said input signal, a combining device for combining said two signal components to produce two output signals one of which is a linearly amplified replica of said input signal, wherein the improvement comprises:

a phase shifter inserted in the path of one of the two signal components between said component separator and said combining device; and

means responsive to the two ouput signals and to the envelope of the input signal for controlling said phase shifter.

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**3,965,434**

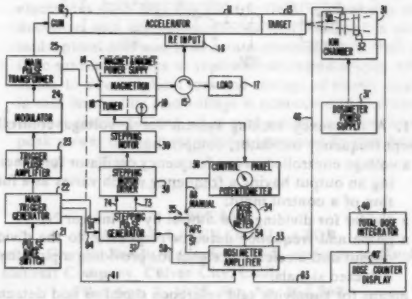
## AUTOMATIC FREQUENCY CONTROL SYSTEM FOR DRIVING A LINEAR ACCELERATOR

**Alan L. Helgesson, Los Altos Hills, Calif., assignor to SHM Nuclear Corporation, Sunnyvale, Calif.**

**Filed Dec. 1, 1972, Ser. No. 311,292**

**Int. Cl.² H05H 9/00**

**U.S. Cl. 328—233** **12 Claims**




1. A particle accelerator system comprising:

an accelerator guide means for accelerating particles,

particle injection means for injecting particles into said guide means,

a source of radio frequency energy,

means for frequency modulating said radio frequency energy source,

means for introducing radio frequency energy from said source into said guide means for energy exchange with and acceleration of said particles,

motor means connected to said source for changing the output frequency of said source,

means connected to said motor means for producing a drive signal to drive said motor means and change said source frequency,

means for sensing the output amplitude of accelerated particles from said accelerator guide means including means measuring current pulses of the accelerated particles from said accelerator guide means, and

means connected to said sensing means and to said drive signal producing means to activate said drive signal producing means and drive said motor means until the sensed output amplitude is maximum, said activating means including means for synchronously demodulating a signal received from said sensing means.

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**3,965,435**

## CIRCUIT FOR DEMODULATING AN AMPLITUDE MODULATED SIGNAL

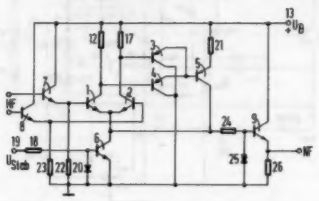
**Hans Kriedt, Munich; Eckart Shatter, Zorneding, and Jean-Marc Zulauf, Munich, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany**

**Filed Apr. 21, 1975, Ser. No. 570,182**

**Claims priority, application Germany, May 9, 1974, 2422534**

**Int. Cl.² H03D 1/18**

**U.S. Cl. 329—101** **13 Claims**




4. A circuit arrangement for the demodulation of an amplitude-modulated signal employing envelope-curve rectification, comprising a high frequency input terminal, a low frequency output terminal, a terminal for connection with a potential source, a reference potential, a reference voltage source, a differential amplifier having two transistors of the same polarity type, the base of a first one of said transistors being connected to said input terminal, the emitters of said transistors being connected together, a constant current source, said emitters being connected through said constant current source to said reference potential, a collector resistor connected between the collector of said first one of said transistors and said potential source terminal, a rectifier, and a current amplifier serially connected between the collector of said first one of said transistors and said two emitters, whereby via a current negative feedback, the operative point of the said transistors remains constant, and whereby said emitters provide an output for a low frequency signal.

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**3,965,436**

## COMPRESSOR AND EXPANDER CIRCUITS FOR COMPANDER SYSTEM

**Robert P. Dixon, Rustburg, Va., assignor to General Electric Company, Lynchburg, Va.**

**Filed June 20, 1975, Ser. No. 588,679**

**Int. Cl.² H03G 7/06**

**U.S. Cl. 330—29** **8 Claims**

1. An improved compressor circuit for reducing the dynamic range of voice signals comprising:

a. a main input for receiving said voice signals;

b. a differential amplifier having an input and first and second differential outputs;

c. means connecting said input of said differential amplifier to said main input;

d. output means having first and second inputs and a common output;

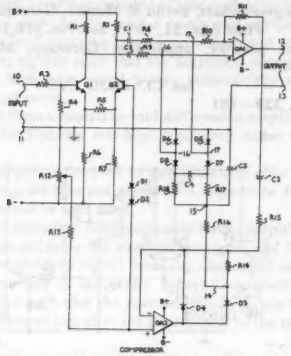
e. means connecting said first and second inputs of said output means to said first and second outputs of said differential amplifier respectively;

f. first and second diode attenuator circuits each having an attenuating terminal and a control terminal;

g. means connecting said attenuating terminals of said first and second diode attenuator circuits to said first and second outputs of said differential amplifier respectively;

h. and means connecting said common output of said output means to said control terminals of said first and second attenuator circuits for causing said attenuator circuits to

attenuate the signals at said first and second outputs of said differential amplifier as a function of the magnitude



of the signals at said common output of said output means.

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**3,965,437**

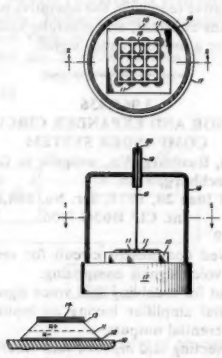
**AVALANCHE SEMICONDUCTOR AMPLIFIER**

**Chung Kyu Kim, Lexington, Mass., assignor to Raytheon Company, Lexington, Mass.**

**Continuation of Ser. No. 360,716, May 16, 1973, which is a division of Ser. No. 291,483, Sept. 22, 1972, abandoned, which is a continuation of Ser. No. 133,642, April 13, 1971, abandoned. This application Aug. 26, 1974, Ser. No. 500,973**

**Int. Cl.² H03F 3/10**

**U.S. Cl. 330—34** **12 Claims**



1. In combination:

a plurality of bodies of semiconductor material, each of said bodies having an elongated region for producing charge carrier multiplication or density variation, the width of said region in a direction substantially transverse to the average direction of motion of said carriers being less than ten times the thickness of said region;

a heat sink thermally coupled to said region of each of said bodies, said heat sink being substantially wider than said width, heat flow away from said bodies having a substantial component parallel to the surface of said heat sink;

a conductive grid coupled to the side of each of said bodies opposite said heat sink operatively connecting said bodies in parallel;

oscillations produced by said charge carrier multiplication being coupled to a load; and

said bodies being arranged in an array of rows and columns upon said heat sink.

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**3,965,438**

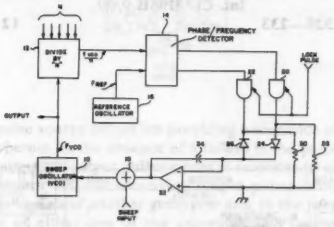
**FREQUENCY LOCKING SYSTEM FOR A VOLTAGE CONTROLLED SWEEP FREQUENCY OSCILLATOR**

**Fendall Gregory Winston, IV, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.**

**Filed Oct. 29, 1974, Ser. No. 518,663**

**Int. Cl.² H03B 3/10, 23/00**

**U.S. Cl. 331—1 A** **5 Claims**



1. A frequency locking system for a voltage controlled swept frequency oscillator, comprising:

a voltage controlled sweep frequency oscillator for generating an output having a frequency which varies as a function of a control input;

a divider for dividing said output by an integer N;

a phase and frequency detector responsive to the divided output and a reference signal for providing a plurality of detected signals;

means for supplying said reference signal to said detector;

means responsive to said detected signals for providing an error voltage representative of any differential in frequency and phase between both said divided output and said reference signal; and

means for adding said error voltage to a sweeping voltage and being operatively connected to said oscillator for locking said oscillator to the center frequency of said sweeping voltage.

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**3,965,439**

**ELECTROOPTIC-Q-SWITCHING SYSTEM FOR A LASER**

**Arthur H. Firester, Skillman, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Dec. 3, 1974, Ser. No. 529,144**

**Int. Cl.² H01S 3/11**

**U.S. Cl. 331—94.5 Q** **5 Claims**

1. An electrooptic Q-switching system for increasing the peak output pulse power and the frequency of a laser, the system comprising:

a laser positioned on one side of a laser cavity, said laser producing a polarized light beam along the optical axis of said laser cavity;

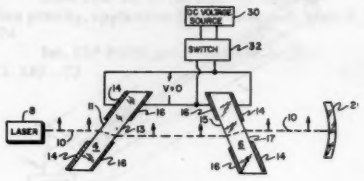
an end reflecting mirror positioned on the optical axis and at the opposite end of said laser cavity from said laser;

a longitudinal configuration of crystalline electrooptic material positioned in said laser cavity between said laser and said end reflecting mirror, said crystalline electrooptic material having longitudinal electrodes in physical contact on each side thereof wherein each of said longitudinal electrodes has an opening along said optical axis so

said polarized light beam may pass therethrough, with the surface of said crystalline electrooptic material positioned at the Brewster angle from said optical axis wherein said polarized light beam travels down the optic axis of said crystalline electrooptic material;

a direct current voltage source; and

switching means connected between said direct current voltage source and said longitudinal electrodes wherein said switching means alternately connects a voltage from




said direct current voltage source to said longitudinal electrodes such that the electric field momentarily produced in said crystalline electrooptic material is along said optical axis and is at a rate commensurate with the time said laser takes to replenish its stored energy while lasing to cause optical loss and storage of excess energy in said laser while said voltage is connected to said longitudinal electrodes and when said voltage is removed the peak power of the laser pulse is increased by said excess energy.

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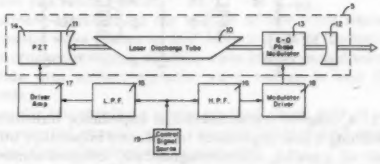
## 3,965,440
## TUNABLE LASER OSCILLATOR

**Ross E. Graves, Pacific Palisades, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.**

**Filed Apr. 2, 1975, Ser. No. 564,569**
**Int. Cl.² H01S *3/10***
**U.S. Cl. 331—94.5 C** **8 Claims**




1. In combination:

a laser oscillator having a pair of end reflecting members defining a resonant laser cavity and a laser medium disposed within said cavity;

means for providing a control signal for controlling the frequency of said laser oscillator;

electro-mechanical means disposed at one end of said cavity for varying the length of said laser cavity substantially in response to components of said control signal below a first frequency;

electro-optical means disposed within said cavity for varying the effective electrical length of said laser cavity substantially in response to components of said control signal above said given frequency;

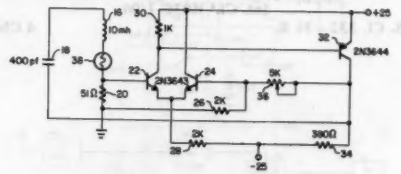
first means for coupling a first component of said control signal to said electro-mechanical means; and

second means for coupling a second component of said control signal to said electro-optical means.

## 3,965,441
## PARALLEL RESONANT CIRCUIT WITH FEEDBACK MEANS FOR INCREASING Q

**Neal L. Roy, Redondo Beach, and David O. Hansen, Oakland, both of Calif., assignors to TRW Inc., Redondo Beach, Calif.**

**Filed June 20, 1975, Ser. No. 588,760**
**Int. Cl.² H03B *7/06***
**U.S. Cl. 331—115** **5 Claims**




1. A parallel resonant circuit, comprising:

a. a capacitor and an inductor having a first side of each thereof connected in common;

b. a resistor connected in series with the second side of said inductor to sense the current in said resonant circuit; and

c. an operational amplifier having its non-inverting input terminal connected to the side of said resistor that is connected in common with said inductor, its inverting input terminal connected to the opposite side of said resistor, and the output terminal connected to the second side of said capacitor;

said operational amplifier serving to introduce a negative resistance into said resonant circuit that is greater than that of said series resistor and thereby to effectively reduce the inherent resistance of said inductor and increase the Q thereof.

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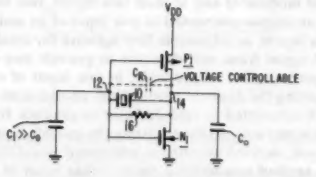
## 3,965,442
## CMOS OSCILLATOR

**Sargent Sheffield Eaton, Jr., Phillipsburg, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Feb. 3, 1975, Ser. No. 546,418**
**Int. Cl.² H03B *5/36***
**U.S. Cl. 331—116 R** **3 Claims**




1. An oscillator comprising, in combination:

two operating voltage terminals,

two field effect transistors of complementary conductivity types, each having a conduction path and a control electrode, said conduction paths connected in series between said operating voltage terminals, said two control electrodes connected to an input terminal, and the connection between said two conduction paths serving as an output terminal;

a regenerative feedback loop comprising a crystal connected between said output and input terminals;

a relatively small value of capacitance connected between said output terminal and a point of reference potential; and

a value of capacitance at least 10 times larger than said small value of capacitance connected between said input terminal and said point of reference potential.

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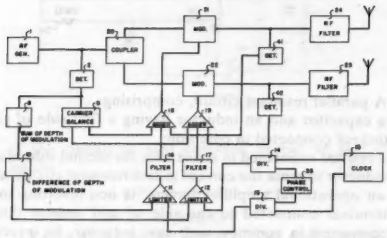
**3,965,443**

## ELECTRONIC MODULATOR FOR GUIDANCE SYSTEMS

**Allistair Towle, and Stanko Brcic, both of Willowdale, Canada, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Sept. 25, 1974, Ser. No. 509,209**
**Int. Cl.² H03C *1/06***
**U.S. Cl. 332—31 R** **4 Claims**




**1.** An amplitude modulation system for use in a navigational system where two overlapping signals modulated at different frequencies are transmitted to indicate course, comprising a source of a carrier wave to be modulated, a source of two modulation signals, a detector connected to e source of the carrier wave for deriving a DC control signal related to the amplitude of the carrier wave, two modulators each having an input for the carrier wave, an input for the modulation signal and an output for the modulated carrier, and modulation amplitude control means including two adders each having an output connected to the input for the modulation signal of an assigned modulator and at least two inputs, two limiters each having an output connected to one input of an assigned adder and two inputs, an adjustable first network for dividing the DC control signal from said detector to provide two differential DC signals applied respectively, to one input of each limiter for adjusting the depth of modulation, an adjustable additional network connected to said detector to produce from the DC control signal a signal for adjusting the overall depth of modulation and, derived therefrom, additional two differential DC signals applied respectively, to the other input of each adder for adjusting the carrier balance in respective modulators whereby the other input of each limiter is connected to said source of modulation signals.

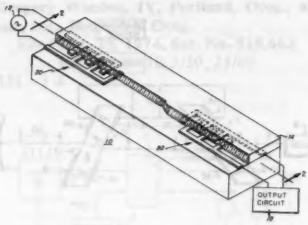
**4.** An amplitude modulation system, comprising a modulator (**5**) to which is supplied a carrier wave and a modulating signal, wherein the depth of modulation of the carrier wave by the modulation signal in the modulator is dependent on the amplitudes of each of the carrier and the modulation signal supplied thereto, and means to control the depth of modulation of the carrier including a further means (**2**) for producing a control voltage representative of the amplitude of the said carrier and a modulation signal amplitude control means (**4**) through which the modulation signal is supplied to the modulator (**5**) and to which the control voltage produced by said further means is supplied to control the amplitude of the modulation signal supplied to the modulator.

**3,965,444**

## TEMPERATURE COMPENSATED SURFACE ACOUSTIC WAVE DEVICES

**Charles B. Willingham; Thomas E. Parker, both of Framingham, and Frank H. Spoone., Concord, all of Mass., assignors to Raytheon Company, Lexington, Mass.**

**Filed Jan. 3, 1975, Ser. No. 538,478**
**Int. Cl.² H03H *9/26, 9/30;* H03B *5/32;* H01L *41/18***
**U.S. Cl. 333—30 R** **39 Claims**




**1.** In combination:
a substrate of lithium tantalate piezoelectric material; and
a layer of silicon dioxide disposed upon a surface of said substrate, the thickness of said layer being determined such that the temperature coefficient of delay for surface waves on said substrate is within a predetermined range of values.

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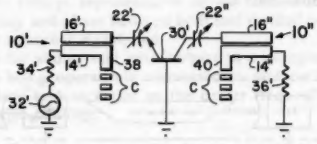
**3,965,445**

## MICROSTRIP OR STRIPLINE COUPLED-TRANSMISSION-LINE IMPEDANCE TRANSFORMER

**Wen-Pin Ou, Tempe, Ariz., assignor to Motorola, Inc., Chicago, Ill.**

**Filed Feb. 3, 1975, Ser. No. 546,593**
**Int. Cl.² H01P *5/08***
**U.S. Cl. 333—33** **13 Claims**




**1.** A coupled-transmission-line impedance transformer for matching a first impedance to a second impedance utilizing a pair of parallel, electromagnetically coupled-transmission-lines disposed on a first surface of a dielectric substrate, and a ground plane disposed on a second surface of the dielectric substrate, comprising:
the first of said pair of transmission lines having first and second ends and a predetermined length and width, said first end being coupled to the first impedance;
first capacitive means coupled between said second end of the first transmission line and the ground plane for varying the effective electrical length of the first transmission line to vary the real part of the transformed impedance through the transformer;
the second of said pair of transmission lines having first and second ends and a predetermined length and width, said first end being open circuited and opposite said first end of the first transmission line; and
second capacitive means for varying the effective electrical length of the second transmission line to vary the imaginary part of the transformed impedance through the transformer, said second capacitive means and said secod

end of the second transmission line being connected in series to the second impedance.

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**3,965,446**

## SURFACE ACOUSTIC WAVE FILTER

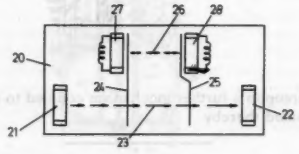
**George Frederick Craven, Heath; John Stuart Heeks, Harlow, and Graham Marshall, Malvern, all of England, assignors to International Standard Electric Corporation, New York, N.Y.**

**Filed Feb. 24, 1975, Ser. No. 552,410**

**Claims priority, application United Kingdom, Mar. 5, 1974, 9767/74**

**Int. Cl.² H03H** *9/26, 9/30, 9/32, 9/04*

**U.S. Cl. 333—72** **9 Claims**




1. A surface acoustic wave filter comprising:

a body of piezoelectric material;

means for propagating a first acoustic wave in a first mode in the surface of said body of said material from an input electric signal;

means for converting a portion of the surface wave energy existing in said first acoustic wave into a second acoustic wave in a second mode;

a resonant structure on the surface of said body wherein acoustic wave energy in said second mode is resonant;

means for reconverting acoustic wave energy in said second mode into surface acoustic wave energy in said first mode;

means for introducing a predetermined phase shift of said reconverted acoustic wave energy relative to said propagated first acoustic wave energy; and

means for recovering combined acoustic wave energy of said first and second phase shift reconverted acoustic wave energies as an electric output signal.

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**3,965,447**

## SYNTHETIC REACTOR CIRCUIT

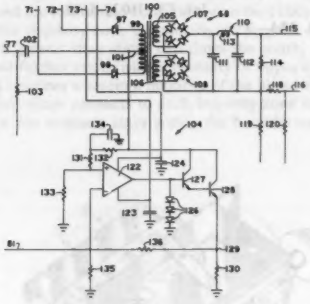
**Robert M. Thomas, Brockville, Canada, assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.**

**Division of Ser. No. 415,481, Nov. 13, 1973. This application Jan. 6, 1975, Ser. No. 538,985**

**Int. Cl.² H03H** *11/00*

**U.S. Cl. 333—80 T** **2 Claims**

1. A synthetic reactor circuit comprising transistor means, an operational amplifier having an output coupled to said transistor means for controlling conduction therethrough, and resistance-capacitance means responding to the voltage across said transistor means and applying a signal to the non-inverting input of said operational amplifier in phase-displaced



relation from said voltage such that the effective impedance presented by said transistor means is a reactive impedance.

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**3,965,448**

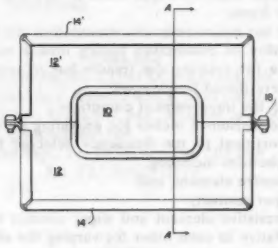
## WAVEGUIDE ISOLATOR WITH DAMPING MEANS

**Wayne L. Browning, Costa Mesa, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed May 7, 1975, Ser. No. 575,305**

**Int. Cl.² A44B** *21/00*

**U.S. Cl. 333—98 R** **11 Claims**




1. A waveguide isolator for attenuating the vibrations of a flexible waveguide comprising:

flexible isolator means capable of enclosing a section of waveguide wall at a proper point along the length of said waveguide to support it to attenuate waveguide vibration and thus prevent a resonant condition, said isolator means being formed from a material which frictionally dissipates energy when flexed, said material comprising a thickly intertwined material impregnated by a low-density flexible foam and an elastic jacket supporting said foam-impregnated material; and

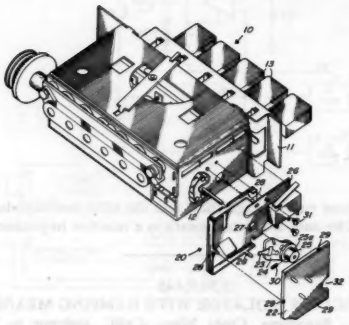
bracket means supporting said isolator means, said bracket means being adapted to be coupled to a relatively immobile foundation so that movement of said waveguide flexes the energy dissipation material of said isolator means within the confines of the relatively immobile bracket means thereby dissipating the movement of said waveguide walls.

3,965,449

## TREADLE BAR DRIVEN POTENTIOMETER

Louis Albert Bevacqua, Des Plaines, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed July 16, 1975, Ser. No. 596,344
Int. Cl.² H03J 5/08
U.S. Cl. 334—7 8 Claims



1. Voltage dependent type tuner comprising
a tuner frame,
treadle bar means rotatably mounted in the frame,
a plurality of pushbutton tuning means mounted in the frame for rotating the treadle bar to repeatably select predetermined frequencies
wherein the improvement comprises
variable resistance means for providing an output voltage proportional to the frequency selected by any of the pushbuttons including
a resistive element, and
a wiper contact,
the resistive element and wiper contact being movable relative to each other for varying the effective output voltage,
one of the resistive element and the wiper contact connected to the treadle bar for rotation therewith in response to pushbutton actuation.

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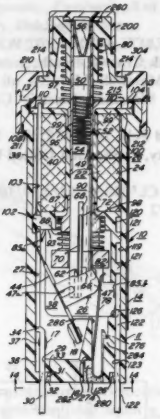
3,965,450

## ELECTROMAGNETIC DEVICE HAVING A MOVABLE TUBE

Keith L. Schilling, Irvington, N.J., assignor to Heinemann Electric Company, Trenton, N.J.

Filed Feb. 6, 1975, Ser. No. 547,483
Int. Cl.² H01H 7/03, 7/14
U.S. Cl. 335—63 54 Claims

1. An electromagnetic sensing device comprising a coil,
a member magnetically coupled to said coil,
an armature movable relative to said member,
a lever carried by said member and movable between first and second positions in response to movement of said armature, and
said armature being operatively connected to said lever to move said lever on sufficient energization of said coil,



whereupon a further mechanism coupled to said lever is actuated thereby.

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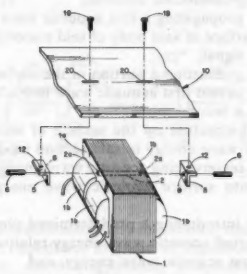
3,965,451

## BALLAST TRANSFORMER MOUNTING ARRANGEMENT

Hendrik A. J. de Vos, Swansea, Mass., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed May 1, 1975, Ser. No. 573,434
Int. Cl.² H01F 15/02
U.S. Cl. 336—67 7 Claims

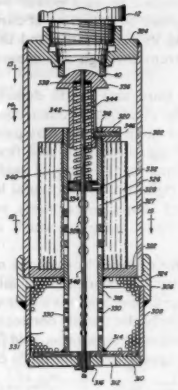


1. A mounting arrangement mounting a ballast transformer to a structural support member, said ballast transformer including a core portion made up of several laminations and having an opening in said core portion with first and second entrances, said mounting arrangement comprising:
a first mounting member having a first elongated, nonthreaded mounting pin associated therewith and inserted, via the first entrance, into the opening in the core portion of the ballast transformer;
a second mounting member having a second elongated, nonthreaded mounting pin associated therewith and inserted, via the second entrance, into the opening in the core portion of the ballast transformer;
first securing means securing the first mounting member to the structural support member; and
second securing means securing the second mounting member to the structural support member.

## 3,965,452
## EXHAUST CONTROL DEVICE FOR CIRCUIT INTERRUPTING DEVICES

**Leonard V. Chabala, Maywood, and Otto Meister, Arlington Heights, both of Ill., assignors to S & C Electric Company, Chicago, Ill.**

**Filed Apr. 1, 1975, Ser. No. 564,075**
**Int. Cl.² H01H** *85/38*
**U.S. Cl. 337—280** **23 Claims**



1. An exhaust control device for a circuit interrupter comprising:

a hollow housing having an intake means for receiving a stream of hot exhaust gases incident to the operation of the circuit interrupter;

heat sink means for cooling the hot exhaust gases positioned in said housing adjacent to said intake means in the stream of travel of the hot exhaust gases;

vortex-producing means for changing the direction of flow of the hot exhaust gases to achieve a momentum energy exchange to slow the speed of travel of the hot exhaust gases and to deposit and condense molten metal and metal vapor carried by the exhaust gases, said vortex-producing means being positioned downstream of said heat sink means;

absorbent means for further cooling the hot exhaust gases, for absorbing water vapor, for attenuating sound, and for filtering out solid debris, molten metal and metal vapor carried by the exhaust gases, said absorbent means positioned downstream of said vortex-producing means;

restricted outlet means in said housing communicating with said absorbent means for attenuating the production of sound by restricting the flow of exhaust gases from the housing into the atmosphere.

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## 3,965,453
## PIEZORESISTOR EFFECTS IN SEMICONDUCTOR RESISTORS

**Thomas Edward Seidel, Berkeley Heights, and Masakazu Shoji, Warren, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Dec. 27, 1974, Ser. No. 536,847**
**Int. Cl.² H01C** *7/00*
**U.S. Cl. 338—13** **7 Claims**

1. A semiconductor integrated circuit in a semiconductor body of a first conductivity type comprising

an impurity zone of the second conductivity type in the semiconductor body for use as a resistor, and

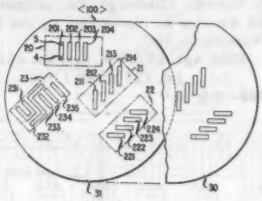
two ohmic contacts to the impurity zone so a line between the contacts stays within the boundaries of the impurity zone and is parallel to a <100> crystallographic direction of the semiconductor body,

wherein the semiconductor is silicon, the first type conductivity is n-type and the second type conductivity is p-type,

wherein a major surface of the silicon body is the (100) plane and the two ohmic contacts are on the (100) plane,

wherein the impurity zone is generally rectangular and has a length greater than about two times the width,

said circuit further comprising a plurality of impurity zones used as resistors wherein a majority of the impurity zones have two ohmic contacts to each impurity zone so a line between the contacts stays within the boundaries of the




respective impurity zone and is parallel to a <100> crystallographic direction,

wherein all of the impurity zones used as resistors have two ohmic contacts to each impurity zone so a line between the contacts stays within the boundaries of the respective impurity zone and is parallel to a <100> crystallographic direction, and

wherein the impurity zone in the semiconductor body has a concentration of first type impurities less than the concentration of second type impurities, the ratio of concentrations being within the range of 0.1 to 0.99 and the sum of the concentrations being at least about $10^{18}$ impurities per cubic centimeter.

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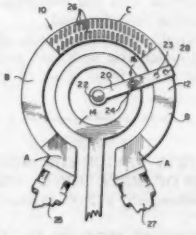
## 3,965,454
## MEANS LOWERING CONTACT RESISTANCE IN VARIABLE RESISTANCE CONTROL

**George O. Puerner, Frankfort, Ind., assignor to P. R. Mallory & Co., Inc., Indianapolis, Ind.**

**Filed Sept. 12, 1974, Ser. No. 505,508**
**Int. Cl.² H01C** *10/32*
**U.S. Cl. 338—174** **6 Claims**



1. A variable resistance control comprising:

a. an electrically insulative substrate,

b. a resistance path and a collector path carried on said substrate,

c. a movable electrical contact arm having an electrical contact engaging said collector path, and at least two electrical contacts engaging said resistance path,

d. electrical terminals electrically connected to said collector and resistance paths, and

e. rows of discrete spots of a good electrically conductive material spaced along said resistance path, the number of rows being equal to the number of electrical contacts engaging said resistance path, and the spots of one row being staggered with respect to the spots of another row such that at least one of the electrical contacts engaging said resistance path will be in engagement with one of said spots as said contact arm moves along said collector and resistance paths.

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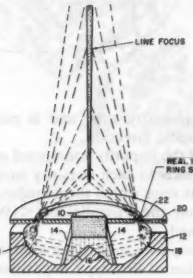
3,965,455

## FOCUSED ARC BEAM TRANSDUCER-REFLECTOR

Michael J. Hurwitz, Pittsburgh, Pa., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 25, 1974, Ser. No. 464,281
Int. Cl.[2] H04B *13/00*
U.S. Cl. 340—8 R 3 Claims




1. An acoustic transducer-reflector for simulating a focused-arc beam comprising:

a disc-shaped transducer mounted forward of and concentrically with the transducer-reflector for radiating a beam of acoustic wave energy rearward toward the reflector;

compound reflector means attached behind said disc transducer for producing an emitted wavefront simulating that which would be radiated by a ring source to produce a line focus with great depth of field, said reflector means including a conical reflector concentrically behind said transducer for reflecting the acoustic waves radially outward, and a surface of revolution reflector, made of a truncated parabola for simulating a real-image ring source, concentric with and positioned radially outward from said conical reflector; and

an aperture stop disc with an annular slot positioned forward of and concentric with said surface of revolution reflector and in the focal plane of the real-image ring source.

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3,965,456

## VEHICLE SAFETY DEVICE FOR MONITORING THE OPERATION OF DIRECTIONAL SIGNAL LAMPS

Robert D. Schwellenbach, 515 E. Missouri, Pierre, S. Dak. 57501

Filed Jan. 17, 1974, Ser. No. 434,249
The portion of the term of this patent subsequent to Oct. 8, 1991, has been disclaimed.
Int. Cl.[3] B60Q *1/26*
U.S. Cl. 340—79 3 Claims

1. In combination with a motor vehicle having a directional signal power switch connected to an electrical power supply, a vehicle safety device comprising:

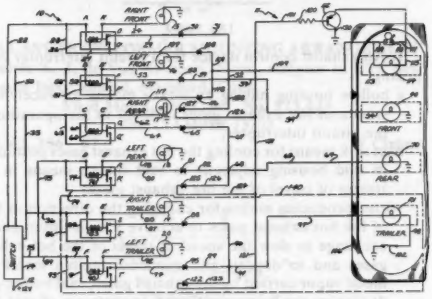
first and second pairs of directional signal lamps, each of said pairs of signal lamps including a left directional signal lamp positioned on said vehicle so as to indicate a left turn when energized, and a right directional signal lamp positioned on said vehicle so as to indicate a right turn when energized, all said directional signal lamps being electrically connected to said directional signal power switch so as to be selectively energized therefrom;

first and second directional signal monitor lights positioned on said vehicle so as to be visible to an operator of said vehicle.

first, second, third and fourth current detection apparatuses, each said detection apparatus including a switch electrically connected to said power switch, each said apparatus in response to detection of current through the apparatus closing its said switch and in the absence of detection of current through the apparatus opening its said width;

said first, second, third and fourth detection apparatuses being operatively electrically connected with said left directional signal lamp of said first pair of lamps, said right directional signal lamp of said first pair of lamps, said left directional signal lamp of said second pair of lamps, and said right directional signal lamp of said second pair of signal lamps, respectively, to detect current flowing to the signal lamp to which electrically connected;

a first pair of monitor diodes having one of its said diodes operatively electrically connected to said switch of said first detection apparatus and having its remaining monitor diode operatively electrically connected to said switch of said second detection apparatus, said first pair of monitor diodes being operatively electrically connected to said




first monitor light to permit current flow toward said monitor light from said first and second detection apparatuses and to block current flow from said monitor light toward said first and second detection apparatuses to thereby light said first monitor light when a directional signal lamp of said first pair of directional signal lamps is lighted to specifically indicate operation of the lighted directional signal lamp, and in the event of failure of a said directional signal lamp of said first pair of signal lamps to light when energized, said first monitor light being unenergized and thereby specifically identifying the failed directional signal lamp of said first pair; and

a second pair of monitor diodes having one of its said diodes operatively electrically connected to said switch of said third detection apparatus and having its remaining monitor diode operatively electrically connected to said switch of said fourth detection apparatus, said second pair of monitor diodes being operatively electrically connected to said second monitor light to permit current flow toward said monitor light from said third and fourth detection apparatuses and to block current flow from said monitor light toward said third and fourth detection apparatuses to thereby light said second monitor light when a directional signal lamp of said second pair of directional signal lamps is lighted to specifically indicate operation of the lighted directional signal lamp, and in the event of failure of a said directional signal lamp of said second pair

of signal lamps to light when energized, said second monitor light being unenergized and thereby specifically identifying the failed directional signal lamp of said second pair.

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## 3,965,457

## DIGITAL CONTROL PROCESSOR

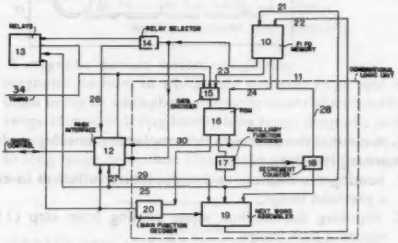
**Keith Harwood, Brunswick, Australia, assignor to L.M. Ericsson Pty. Ltd., Australia**

**Filed Nov. 13, 1973, Ser. No. 415,423**

**Claims priority, application Australia, Nov. 13, 1972, 1198/72**

**Int. Cl.² G06F** *15/46;* **G05B** *15/02, 19/02*

**U.S. Cl. 340—172.5** **4 Claims**



**1.** A digital control processor for controlling the operation of a plurality of external relay units comprising a first-in first-out memory for storing a plurality of memory words, each of said memory words comprising at least two fields, one of said fields containing the address information of one of the plurality of external relay units, the other of said fields containing process control information, decoding means for decoding said field containing said address information of said external relay unit, said decoded field providing an address of one of a plurality of said external units, means for transmitting said address to said external unit, a combinational logic unit, means for transmitting information from the addressed external unit relevant to its state of operation to said combinational logic unit, said combinational logic unit accepting said information from the addressed external unit and from said memory the other of said fields of said memory word for producing process control signals, means in said combinational logic unit receiving said process control signals for generating state control signals for the addressed external unit, means in said combinational logic unit receiving said process control signals for selectively generating memory words, said memory words comprising at least two fields one of said fields containing the address information of an external relay unit, the other of said fields containing process control information, means for transmitting said state control signals to said addressed external relay unit to cause said addressed external relay unit to change its state, and means for transmitting said generated memory word to said first-in first-out memory, the generated state control and memory signals by the means in the combinational logic unit at any instant of time being determined solely by the input thereto independently of any prior inputs thereby rendering the signals generated completely independent of previously generated signals.

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## 3,965,458

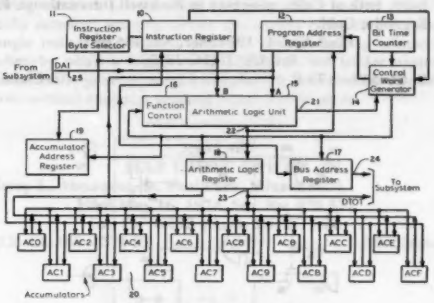
## CENTRAL PROCESSOR FOR A TELEPHONE EXCHANGE

**Robert A. Borbas; John P. Dufton, both of Brockville; James H. Foster, Smithsfalls, and Jeffrey W. Siegel, Brockville, all of Canada, assignors to GTE Automatic Electric (Canada) Limited, Brockville, Canada**

**Filed Sept. 27, 1974, Ser. No. 510,092**

**Int. Cl.² H04Q** *3/54;* **G06F** *9/06*

**U.S. Cl. 340—172.5** **21 Claims**




**1.** A central processor for controlling the operation of subsystems which are interconnected on a common data bus of a telephone exchange to establish requested service between telephone subscribers, wherein the exchange includes a program memory also connected to the common data bus and containing a plurality of addressable multiple bit operational codes to be utilized by the central processor, said central processor comprising:

a program address register including means for providing and storing the address in the program memory which contains an operational code to be utilized by the central processor;

an arithmetic logic unit having an input coupled to said program address register for receiving the program memory address from said program address register, said arithmetic logic unit additionally having an output;

a bus address register having an input coupled to said arithmetic logic unit output and having an output coupled to the common data bus for receiving the program memory address from said arithmetic logic unit and for addressing the program memory at the program memory address over the common data bus to cause the program memory to transmit the operational code over the common data bus;

an instruction register having an input and an output for storing the operational code and for providing subsystem address signals responsive to the operational code;

said arithmetic logic unit input also being coupled to said common data bus for receiving the operational code and said arithmetic logic unit output being coupled to said instruction register input for transferring the operational code to said instruction register, said arithmetic logic unit also having another input coupled to said instruction register output for receiving said subsystem address signals therefrom and for transferring said subsystem address signals at said arithmetic logic unit output to said bus address register for causing said bus address register to address the subsystems corresponding to said subsystem address signals for obtaining subsystem data therefrom, and said arithmetic logic unit also including means for performing logic and arithmetic functions responsive to function control signals to provide subsystem data and control signals;

a bit time counter for providing sequential operational timing signals; and

a control word generator coupled to said instruction register for providing said function control signals responsive to

the operational code stored in said instruction register and coupled to said bit time counter for coacting therewith to provide said function control signals in proper time sequence.

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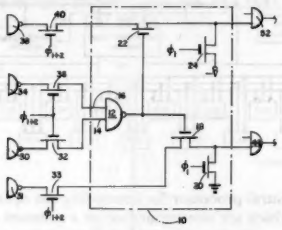
3,965,459

**SELECTABLE EIGHT OR TWELVE DIGIT INTEGRATED CIRCUIT CALCULATOR AND CONDITIONAL GATE OUTPUT SIGNAL MODIFICATION CIRCUIT THEREFOR**

**John R. Spencer, Villa Park, and Bruce W. Kinney, Jr., Anaheim, both of Calif., assignors to Rockwell International, El Segundo, Calif.**

**Filed Apr. 1, 1974, Ser. No. 456,997**
**Int. Cl.² G11C *13/00***
**U.S. Cl. 340—173 R** **6 Claims**



**1.** A random access memory system having memory registers of selectable length comprising:

a matrix of random access memory cells arranged in $2^k$ rows of $3 \times 2^n$ memory cells each, where $n$ is zero or a positive integer and $k$ is a positive integer;

row and column address decoding means for decoding address signals to access the proper memory cells;

address modification means for controlling the register configuration of the memory by modifying addresses supplied to the memory system prior to their application to the row and column decoders.

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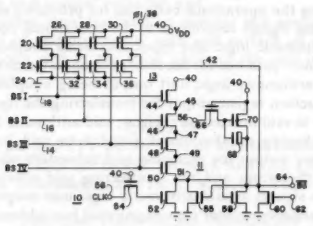
3,965,460

**MOS SPEED-UP CIRCUIT**

**Bruce J. Barbara, Tempe, Ariz., assignor to Motorola, Inc., Chicago, Ill.**

**Filed Jan. 2, 1975, Ser. No. 537,992**
**Int. Cl.² G11C *7/00*, *11/24***
**U.S. Cl. 340—173 R** **15 Claims**



**1.** A speed-up circuit comprising first circuit means coupled, respectively, to a plurality of inputs for sensing a beginning of a voltage transition on one of said inputs and generating a feedback signal, each of said inputs being electrically isolated from the others of said inputs; and

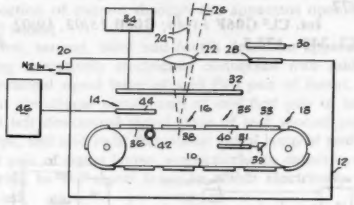
second circuit means said first circuit means responsive to said feedback signal coupled to said plurality of inputs for speeding up a remaining portion of said transition.

3,965,461

**THERMOPLASTIC IMAGE RECORDING SYSTEM**

**John E. Wreede, Monrovia; Terence C. Stoddard, West Covina, and Kenneth R. Erikson, Orange County, all of Calif., assignors to McDonnell Douglas Corporation, Long Beach, Calif.**

**Filed Apr. 30, 1975, Ser. No. 573,135**
**Int. Cl.² G11C *11/46*, *7/00***
**U.S. Cl. 340—173 TP** **13 Claims**



**1.** A method for utilizing a thermoplastic recording medium comprising the steps of:

1. heating the medium to a temperature sufficient to erase a previous image;
2. exposing the medium while cooling from step (1) to record a new image;
3. cooling the medium.

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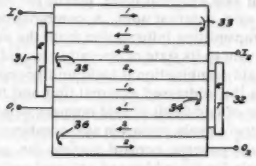
3,965,462

**SERPENTINE CHARGE-COUPLED-DEVICE MEMORY CIRCUIT**

**Ronald A. Belt, Dayton, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed May 9, 1975, Ser. No. 576,059**
**Int. Cl.² G11C *11/40*, *13/00***
**U.S. Cl. 340—173 R** **2 Claims**



**1.** A serpentine charge-coupled-device memory apparatus comprising:

a. a first array comprising a plurality of an even number of CCD linear shift registers;

b. a second array comprising a plurality of an even number of CCD linear shift registers interleaved with the said first plurality of shift registers in a two-by-two relationship;

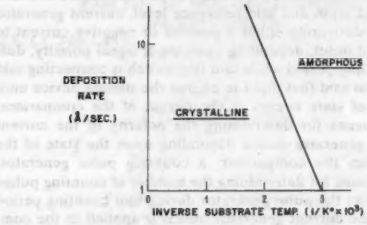
c. a turn-around circuit coupling each adjacent shift register of the same array; and

d. a refresh-turn circuit coupling shift registers of the same array having interleaved registers of the other array.

## 3,965,463
## APPARATUS USING AMORPHOUS MAGNETIC COMPOSITIONS

**Praveen Chaudhari, Briarcliff Manor; Jerome J. Cuomo, Bronx, and Richard J. Gambino, Yorktown Heights, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Continuation of Ser. No. 284,513, Aug. 29, 1972, abandoned.**
**This application May 27, 1975, Ser. No. 581,078**
**Int. Cl.² G11C *11/14***
**U.S. Cl. 340—174 TF** **63 Claims**

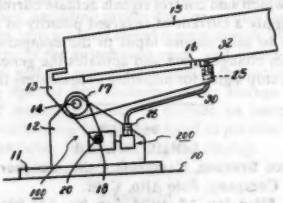



1. A magnetic domain system comprising:
a magnetic medium in which said domains exist, said medium being an amorphous magnetic material without long range atomic ordering having long range magnetic ordering and a magnetic uniaxial anisotropy which is not due to long range crystalline structure, and means for sensing said domains in said amorphous magnetic medium.

## 3,965,464
## DEVICE FOR AUTOMATICALLY DETECTING OVERLOAD ON AERIAL LADDER TRUCK

**Tetsuo Kozai, Osaka, Japan, assignor to Morita Pump Kabushiki Kaisha, Osaka, Japan**

**Filed Nov. 21, 1974, Ser. No. 525,930**
**Int. Cl.² G08B *19/00***
**U.S. Cl. 340—267 C** **4 Claims**

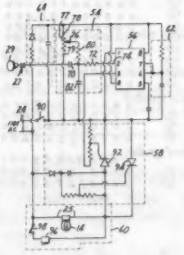



1. In an aerial ladder truck assembly having a truck body, a turntable unit mounted on the truck body, ladder support block means mounted on the turntable unit, horizontal shaft means mounted on the support block means, ladder support frame means mounted on the horizontal shaft means of the ladder support block means for vertically swinging relation therearound, ladder means mounted at one end to the ladder support means and stop means for the ladder means, the improvement of safety means for automatically detecting a weight overload on the ladder means at any given angle comprising ladder vertical angle detecting means mounted on the ladder support block means, said ladder angle detection means including disk means having a plurality of contacts denoting successive angle positions mounted thereon and angle position pointer means pivotally mounted for movement relative to said disk means from angle contact to angle contact, said movement being actuated by movement of the ladder means to correspond to the actual angle position of the ladder means, ladder load detecting means to denote the weight load on said ladder means, said load detecting means including load detecting fluid operated cylinder means actuatable by a load placed on the stop means of the ladder means, disk means containing a plurality of load indicating contacts positioned therearound, each of said load indicating contacts denoting a specific weight per square centimeter load value, a load pointer mounted for movement relative to said disk means from load contact to load contact, said pointer movement actuated by pressure from the fluid operated cylinder means to indicate the load placed on the ladder means, said angle indicating contacts and said load indicating contacts being electrically connected to one another, and an electrically actuated warning device electrically connected to said angle indicating contacts and said load indicating contacts whereby when a weight load placed on the ladder means exceeds the predeterminted weight limit loads for the respective vertical angles, a warning signal will be given.

## 3,965,465
## SELF TIMING SWITCH

**Jerry L. Alexander, St. Paul Park, Minn. 55071**

**Filed May 16, 1974, Ser. No. 470,537**
**Int. Cl.² G08B *13/26*; E05B *17/10***
**U.S. Cl. 340—274 R** **10 Claims**



1. An electrical switch device for controllably energizing load comprising:
timing means adapted for being switched from a stable state to a quasi-stable state in response to a negative activation signal and for providing an output signal when in said quasi-stable state;
a dwell-time-constant network coupled to said timing means for controlling the time during which said timing means remains in said quasi-stable state;
slave switching means coupled to receive said output signal for controlling the application of electrical power to a said load;
a manually operable sensitivity adjust network coupled to said timing means and comprising means for selectively controlling the intensity of a said activation signal needed to switch said timing means and means for providing a negative activation signal for said timing means to continuously activate said timing means, said sensitivity adjust network including a control comprising:
a support having a surface extending between a first terminal connected to a source of positive voltage, and a second terminal coupled to a source of negative voltage, said surface comprising a non-conductive surface portion proximate said second terminal, and a resistive surface portion between said first terminal and said non-conductive surface portion; and
a contact coupled to provide at least a portion of a said activation signal and being manually movable along said surface between said terminals so that when said contact is on said second terminal a negative activation signal is provided to cause said timing means to remain in said quasi-stable state, and when said movable contact is contacting said resistive portion a positive bias is pro-

vided to ensure that only an activation signal of a predetermined negative value will switch said timing means to said quasi-stable state; and

power supply means energized by said electrical power for energizing said timing means, said sensitivity adjust network and said dwell-time-constant network.

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## 3,965,466
## DIGITAL DISPLAY

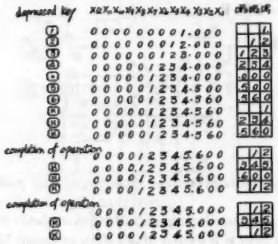
**Atsushi Asada; Hideo Yoshida, both of Nara, and Akihiko Kunigane, Yamatokoriyama, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Apr. 23, 1974, Ser. No. 463,266**

**Claims priority, application Japan, Apr. 23, 1973, 48-45926; May 18, 1973, 48-56637**

**Int. Cl.² G08B 5/36**

**U.S. Cl. 340—336** **10 Claims**




**1.** A digital display system controlled in a dynamic fashion in an electronic calculator comprising:

display means having N digits capacity, said display means including N display units, each of said units comprising a common electrode and a plurality of segment electrodes;

a first register means for storing the numeral information to be displayed, the digit capacity of the first register means being M times the N digits of the display units, wherein M is an integer greater than or equal to 3; a first buffer register means for storing digit information transmitted digit by digit from the first register means, the content of the first buffer register being supplied through a decoder to the segment electrodes of the display units;

a counter means for generating time division signals appearing during one word period once every N words, each of the signals being supplied to the common electrode of the display units;

conditional flip-flops for selecting a display block in the first register means consisting of M blocks each of which includes N digits and generating a block signal;

shifting means for sequentially shifting a condition of the conditional flip-flops to change the display block;

a matrix circuit receiving the time division signal, the block signal and digit time signals and generating a gate control signal; and

gate means connected between the first register means and the first buffer means for controlling the output signals of the first register means by the gate control signal whereby one word of the digit numeral information contained in the display block of the first register means is transmitted selectively to the first buffer register means.

## 3,965,467
## ANALOG-TO-DIGITAL CONVERTERS

**Raymond Frederick Monger, Red Gables, Ruston Park, Rustington, Sussex, England**

**Filed Aug. 12, 1974, Ser. No. 497,120**

**Int. Cl.² H03K 13/02**

**U.S. Cl. 340—347 NT** **9 Claims**

**1.** A bipolar analog-to-digital converter comprising a comparator having first and second inputs and an output, first and second switches for alternately connecting first and second signal levels to said first input, said first level comprising an input signal to be converted and said second signal level comprising a reference level, a storage device connected between said second input and said reference level, current generator means for delivering either a positive or negative current to said second input, depending upon input signal polarity, during a counting period while said first switch is connecting said first level to said first input to charge the storage device until a change of state occurs at the output of the comparator, selector means for determining the polarity of the current from said generator means depending upon the state of the output from the comparator, a counting pulse generator, counter means for determining the number of counting pulses emitted from the pulse generator during said counting period in which the current generator means is applied to the comparator before said change of state occurs; and a clocking generator operative to generate control signals controlling periods of operation of said converter and including generator means operative for generating a stop signal each time the comparator changes state, said periods including a first period during which said control signals actuate said switches to apply said first input level to said first input of said comparator while the comparator settles, a second counting period initiated by said clocking generator during which said control signals initiate delivery of pulses to said counter means and actuate said current generator means to apply current of selected polarity to said storage device and to said second input of the comparator until its output changes state, a third period initiated by the latter change of state during which said control signals disable said current generator means reverse said switches to substitute said second reference level for said first input level and cease the delivery of pulses to said counter means, and a fourth period initiated by said clocking generator during which said control signals actuate current generator means to apply a current of reversed polarity to said storage device and to said second input to the comparator until its output again changes state and actuates the generator means to deliver a stop signal for initiating a succeeding first period.

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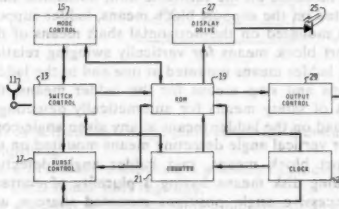
## 3,965,468
## LOGIC PULSER

**Barry Steven Bronson, Campbell, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Jan. 17, 1975, Ser. No. 541,806**

**Int. Cl.² G08C 1/00**

**U.S. Cl. 340—349** **6 Claims**




**1.** A logic pulser for generating electronic pulses to induce changes of state in digital logic circuitry under test, said pulser comprising:

means for generating pulses in a plurality of operating modes comprising (1) single pulses, (2) continuous streams of pulses, and (3) recurring pulse bursts containing a predetermined number of pulses; and

coding means for serially encoding mode selection commands to select among said plurality of operating modes.

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**3,965,469**

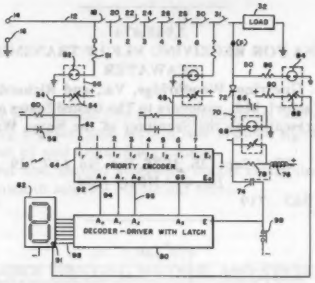
**ANNUNCIATOR STRUCTURE AND METHOD**

**Thomas J. Ryan, Olmstead Falls, Ohio, assignor to The North American Manufacturing Company, Cleveland, Ohio**

**Filed July 30, 1974, Ser. No. 493,038**

**Int. Cl.² G08C** *1/00*

**U.S. Cl. 340—415** **5 Claims**




1. Annunciator structure for monitoring a series circuit including a plurality of series connected switches and having a terminal between each switch and for providing a visual indication of which of the switches first opened after the circuit has initially been completed, comprising a separate sensing circuit associated with each of the swithces connected between a separate one of said terminals and a common potential operable to provide a predetermined logic signal output pattern in response to a predetermined pattern of closure of the switches, encoding means for converting the predetermined pattern into a coded signal representative of a designation of the first of the switches to open, and means for decoding the signal and for providing a display indicating which of the switches opened first including delay storage means for latching said decoding means to provide an indication of a particular switch being first to open and to prevent opening of subsequent switches from affecting the display.

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**3,965,470**

**PULSE ANALYZER FOR AN RF MOVING TARGET DETECTOR**

**Glenn G. Clinard, Upland; Kenneth C. Guth, Pomona; Gail R. Mulhollam, Upland, all of Calif., and Frank J. Volk, Hickory Hills, Ill., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Dec. 13, 1972, Ser. No. 314,645**

**Int. Cl.² G01S** *9/02*

**U.S. Cl. 343—5 PD** **2 Claims**

1. In an RF target detector based on varying impedance, an apparatus for detecting the closest point of approach and the occurrence of the minimum detectable range when fed by read pulses indicative of thresholds of impedance and threshold count pulses indicative of the rate of changing impedance values, comprising:

a. a first counter fed by the threshold count pulses;

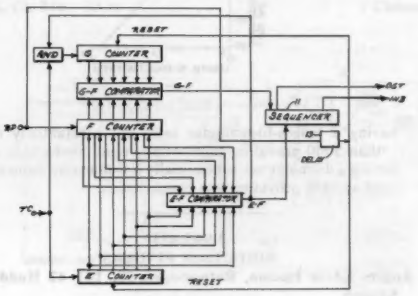
b. a second counter fed by the value in the first counter upon receipt of a read pulse;

c. a first means for comparing the counts in the first and second counters and generating a pulse when the count of the first counter exceeds that of the second counter;

d. a delay circuit fed by the read pulses and generating a delayed reset pulse resetting the first counter;

e. a sequencer fed by the first comparing means and in the absence of pulses therefrom generating a signal indicative of the outward bound motion of the target;

f. an AND gate fed by the threshold count pulses and the first comparing means;




g. a third counter fed by the AND gate and the reset pulses of the delay circuit; and

h. a second means for comparing the counts in the second and third counters and generating a pulse upon the equality of the counts therefrom and feeding the sequencer.

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**3,965,471**

**RADIATION DETECTION SYSTEM**

**Floyd A. Haeuszer, Cannon Falls, Minn., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Aug. 13, 1969, Ser. No. 851,151**

**Int. Cl.² G01S** *7/36*

**U.S. Cl. 343—18 E** **2 Claims**

1. A radiation detection system comprising radiation sensor means adapted to generate trigger signals in response to radiation transients that exceed a discrete threshold level, a blocking oscillator connected thereto adapted to generate a pulse in response to each said trigger signal, and OR gate, and an output pulse duration control circuit adapted to generate an OR gate actuating signal of given duration in response to each said blocking oscillator pulse, said blocking oscillator being connected to deliver simultaneously pulses generated thereby to a first OR gate input and to said output pulse duration control circuit, said output pulse duration control circuit being connected to a second OR gate input.

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**3,965,472**

**OFF-RESONANT CHAFF SYSTEM FOR A LARGE TARGET VIEWED BY LOW FREQUENCY RADAR**

**James Nickolas Constant, 1603 Danbury Drive, Claremont, Calif. 91711**

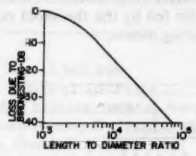
**Continuation of Ser. No. 304,546, Nov. 7, 1972, abandoned, which is a continuation of Ser. No. 69,185, Sept. 2, 1970, abandoned. This application Apr. 10, 1974, Ser. No. 459,542**

**Int. Cl.² H04K** *3/00*

**U.S. Cl. 343—18 E** **4 Claims**

1. A method for masking large targets viewed by radar operating at VHF or lower frequency comprising

dropping a plurality of separable electric conductors of a length forming dipoles resonating at a frequency substantially above the frequency of the radar, and




having a length-to-diameter ratio not substantially more than 3000 providing substantially rigid conductors, and having a diameter not substantially less than one thousandth of an inch providing low ohmic losses.

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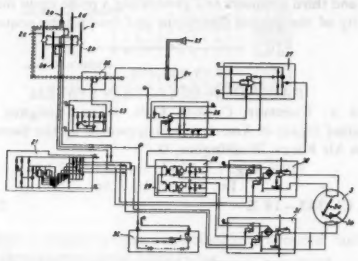
**3,965,473**

## DIRECTION FINDERS

**Anders Edvin Isacson, Rotnasvagen 58, 141 42 Huddinge, Sweden**

**Filed Aug. 28, 1974, Ser. No. 501,342**
**Int. Cl.² G01S *5/04***
**U.S. Cl. 343—122** **2 Claims**



1. A direction finder comprising in combination:

a. An antenna system including one central antenna (2*a*) capable of receiving signals from an area equivalent to a circular antenna diagram and four secondary radiators or parasite antennae, said central antenna (2*a*) in combination with two parasite antennae (2*b*) and (2*c*) being capable of receiving signals from an area equivalent to a right-hand lobe antenna diagram system, or said central antenna (2*a*) in combination with the other two parasite antennae (2*d*) and (2*e*) being capable of receiving signals from an area equivalent to a left-hand lobe antenna diagram or system, and means (24) for receiving signals received by the central antenna itself and signals received either by the left-hand or the right-hand lobe diagram or system in different time slots;

b. a control pulse generator (21) for generating output pulses and means connecting said pulse generator to said antenna system to activate the antennae in the following coupling sequences:

i. one pair of parasite antennae and the central antenna,

ii. central antenna alone,

iii. the other pair of parasite antennae and the central antenna,

iv. central antenna alone;

c. said signal receiving means (24) being connected to said antenna system for receiving a signal during each coupling sequence, a low frequency rectifier means (28) having an input connected to said signal receiving means (24) to receive such signals from said receiving means and an output, a first comparison means (30) for responding to the received signal during coupling sequence (i) and (iii);

c. a second indicator means (3*b*) connected to second comparison means (31) for responding when the signal received during coupling sequence (ii) or (iv) exceeds the signal received during coupling sequence (i) or (iii);

said control pulse generator (21) being adapted to generate output pulses to activate said first (30) and second (31) comparison means during each coupling sequence (i) to (iv) and said antenna system being so designed that said right-hand lobe antenna diagram partly overlaps said left-hand lobe antenna diagram so that the maximum common signal intensity received from each of said diagrams in one and the same direction exceeds the corresponding signal intensity received by the main antenna (2*a*) from the circular antenna diagram alone in said same direction.

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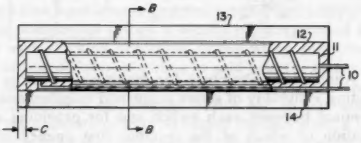
**3,965,474**

## ANTENNA FOR RECEIVING VLF/LF TRANSMISSION IN SEAWATER

**David L. Guerrino, Woodbridge, Va., and Richard W. Cole, Jr., Waldorf, Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Sept. 26, 1975, Ser. No. 617,229**
**Int. Cl.² H01Q *1/04***
**U.S. Cl. 343—719** **10 Claims**




1. An apparatus for providing improved reception of very low frequency and low frequency transmissions in seawater comprising:

a loop antenna;

a non-conductive housing enclosing said loop antenna; and

projection means attached to said housing for reducing circulating conduction currents about said antenna.

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**3,965,475**

## SWITCHABLE BEAMWIDTH MONOPULSE METHOD AND SYSTEM

**Leonard F. Deerkoski, Crofton, and Richard F. Schmidt, Seabrook, both of Md., assignors to The United States of America as represented by the United States Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed May 30, 1975, Ser. No. 582,318**
**Int. Cl.² H01Q *3/26***
**U.S. Cl. 343—854** **9 Claims**

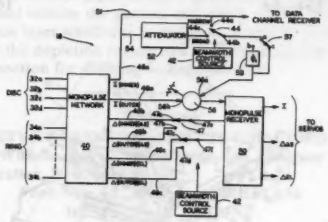
1. A switchable beamwidth monopulse antenna having selectively a wide beamwidth mode and a narrow beamwidth mode responsive to a beamwidth selection command source, the antenna including a curved reflector having a boresight axis with a focal region of the reflector lying on said axis, there being associated with the antenna an Airy disc lying in the focal region, said Airy disc surrounded by an Airy ring, comprising:

a first set of monopulse feeds located in an effective region of said Airy disc of said antenna;

a second set of monopulse feeds located outside said Airy disc in the region of said Airy ring;

first switching means for causing said antenna to operate in the narrow beamwidth mode including means connected to said first set of feeds for developing first sum and difference channel signals;

second switching means for causing said antenna to operate in the wide beamwidth mode including means connected to said second set of feeds for developing second sum and difference channel signals, means for attenuating and




phase shifting said first sum channel signal, and means for adding together said second sum channel signal and the output of said attenuating means;

said first and second switching means controlled by said beamwidth selector command source.

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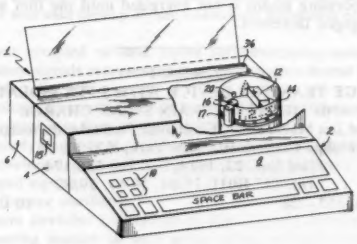
## 3,965,476

## LASER PRINTING METHOD AND SYSTEM

**Per E. Wenander, Schweiz, and Carl E. Lundquist, Lucerne, both of Switzerland, assignors to Per E. Wenander, Meggen, Switzerland**

**Filed July 5, 1974, Ser. No. 486,167**
**Int. Cl.² B41B 17/10; G06K 15/02**
**U.S. Cl. 346—1** **28 Claims**




1. A method of recording on a receiving medium comprising the steps of:

a. directing a first radiant energy beam through an aperture mask thereby providing a first aperture-shaped beam,

b. displaying said first aperture-shaped beam by moving an optical element in a first direction,

c. storing data signals corresponding to said displayed first aperture-shaped beam,

d. subsequent to said displaying and storing steps directing a second radiant energy beam through said aperture mask for providing a second aperture-shaped beam corresponding to said stored data signals, and

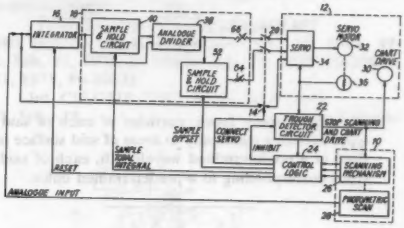
e. marking a surface of said receiving medium with said second aperture-shaped beam by moving said optical element in a second, opposite direction.

## 3,965,477

## AUTOMATIC GRAPHING APPARATUS

**James Hambleton; Peter Frank Davies; Philip Edward Harley, and Gianfranco Corsi, all of 8, Princesway, Team Valley, Durham, England**

**Filed Apr. 4, 1974, Ser. No. 457,848**
**Claims priority, application United Kingdom, Apr. 9, 1973, 16836/73**
**Int. Cl.² G01D 1/04**
**U.S. Cl. 346—33 A** **7 Claims**




1. Apparatus for producing a graph of a function represented by a varying analogue input signal, comprising:

display means for tracing out in a graphing operation the graph of said function as said input signal is supplied to the apparatus;

calculating means including an integrator for providing an output proportional to the time integral of said input signal as it is supplied to the apparatus;

input means for supplying said input signal simultaneously to the display means and calculating means;

said input means including first switch means between said input means and said display means;

second switch means through which said calculating means is connected to said display means to selectively supply the said output thereto;

a trough detector circuit;

means for supplying to the trough detector circuit a signal derived from said input signal;

the trough detector circuit detecting the occurrence of a minimum point in the input signal and supplying a control signal at each such occurrence;

control means connected to the display means, trough detector circuit and said first and second switch means, the control means, in response to a control signal from the trough detector, acting to actuate said first and second switch means to disconnect the input signal from the display means, and to connect the calculating means to the display means, thereby to interrupt the graphing operation and cause the display means to display a value indicative of said output of the calculating means, and thereafter to cause the display means to resume the graphing operation, whereby the display means displays both the graph of said function and values indicative of the time integral of said function between successive interruptions of the graphing operation.

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## 3,965,478

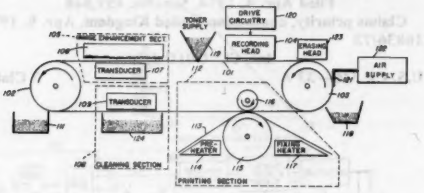
## MULTICOLOR MAGNETOGRAPHIC PRINTING SYSTEM

**Ernst F. R. A. Schloemann, Weston, Mass., assignor to Raytheon Company, Lexington, Mass.**

**Continuation of Ser. No. 372,142, June 22, 1973, abandoned.**
**This application Dec. 9, 1974, Ser. No. 530,627**
**Int. Cl.² G01D 15/12, 15/20**
**U.S. Cl. 346—74.1** **30 Claims**

1. A color magnetographic printing system comprising in combination:

means for magnetizing a magnetizable surface with a plurality of recording wavelengths; and




a plurality of toner types, particles of each of said toner types adhering maximally to areas of said surface magnetized at a predetermined wavelength, each of said toner types corresponding to a predetermined color.

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**3,965,479**

## MULTI-STYLUS PRINTING HEAD

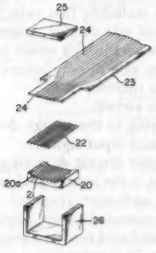
**Naraji Sakamoto, Toyonaka; Tatsuo Mitsui, Hirakata, and Toshio Hayakawa, Katano, all of Japan, assignors to Matsieshita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Sept. 16, 1975, Ser. No. 613,899**

**Claims priority, application Japan, Sept. 20, 1974, 49-109090**

**Int. Cl.[2] G01D** *15/06*

**U.S. Cl. 346—139 C** **3 Claims**




1. A multi-stylus printing head cell comprising

a. a base made of an insulating material with a shallow recess formed lengthwise in one of the major surfaces thereof, a plurality of parallel grooves being formed in the bottom of said recess,

b. a plurality of electrodes or styli placed in said grooves, respectively, and bonded with an adhesive,

c. a flat flexible cable consisting of an insulator and a plurality of conductors in the form of a foil, the leading end portions of said conductors being exposed from the insulator and overlaid upon said styli so as to attain the electrical connection with said styli, respectively,

d. a retaining plate placed upon said leading end portions of said conductors overlaid upon said styli, and

e. a U-shaped holder adapted to hold said base, said styli and said flat flexible cable with the side walls or legs of said U-shaped holder folded inwardly over said retaining plate whereby said base, said styli and said flat flexible cable may be securely held in position.

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**3,965,480**

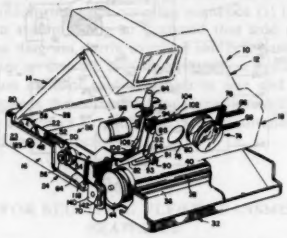
## MANUALLY OPERATED PHOTOGRAPHIC PROCESSING SYSTEM

**Vaito K. Eloranta, Needham, Mass., assignor to Polaroid Corporation, Cambridge, Mass.**

**Filed Dec. 23, 1974, Ser. No. 535,377**

**Int. Cl.[2] G03B** *17/50*

**U.S. Cl. 354—83** **16 Claims**



1. In a photographic apparatus for effecting exposure and processing of at least one self-processable film unit, said apparatus including a housing having means for supporting the film unit in an exposure position, film transport and processing means, and film advance means for moving the film unit out of the exposure position and into engagement with the film transport and processing means, an improvement comprising:

an actuatable drive means for supplying energy to power said film advance means and said film transport and processing means; and

means for selectively transferring motion of said actuatable drive means to effectuate in consecutive sequence the energization of first said film advance means to advance the film unit out of said exposure position and into engagement with said film transport and processing means and then said film transport and processing means to continue the advancement of the film unit while simultaneously spreading a processing fluid across a photosensitive layer of the film unit such that said film transport and processing means is not energized until the film unit is engaged therewith.

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**3,965,481**

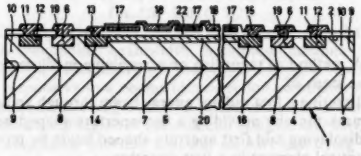
## CHARGE TRANSFER DEVICE WITH J FET ISOLATION AND MEANS TO DRAIN STRAY CHARGE

**Leonard Jan Maria Esser, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Nov. 22, 1974, Ser. No. 526,174**

**Int. Cl.[2] H01L** *27/04, 29/64, 29/80*

**U.S. Cl. 357—24** **10 Claims**



1. A semiconductor device having a semiconductor body and comprising a surface layer of one conductivity type which adjoins a surface of the body, is provided on a support and is separated from said support by a junction destined for electric insulation, in which at least one component is present in the surface layer in behalf of which the surface layer comprises island-insulating means in the form of an electrode pattern which is present at the surface and which surrounds at least an

island-shaped part of the surface layer comprising the component and which is separated from the surface layer by a barrier junction, in which by means of the electrode pattern electric fields can be induced in the surface layer by means of which fields a depletion region is formed below the electrode pattern and extends throughout the thickness of the surface layer, a part of the surface layer which is present at the edge of the surface and outside the pattern and which adjoins the part of the surface layer which can be influenced with the pattern and in which the depletion region can be formed, having an electric connection for draining leakage currents.

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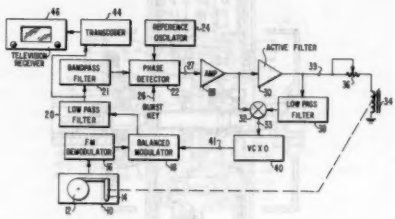
## 3,965,482
## VELOCITY CORRECTION CIRCUIT FOR VIDEO DISCS

**Thomas William Burrus, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.**

**Filed Nov. 12, 1974, Ser. No. 522,816**
**Int. Cl.² H04N** *5/76, 5/80*
**U.S. Cl. 358—8** **5 Claims**




**4.** In a video disc player in which a signal pickup stylus cooperates with a signal information storing groove of a disc subject to rotation at a given rotational frequency to recover recorded composite video signals including luminance, chrominance and color synchronization signal components, and wherein said recovered signal components are undesirably subject to frequency errors as a consequence of deviations from a desired velocity of relative motion between said disc groove and said pickup stylus, correction apparatus comprising:

means coupled to said stylus for developing composite video signals representative of information stored in said video disc groove;

a voltage controlled oscillator providing oscillations of a controllable frequency;

heterodyning means responsive to said oscillations and said developed signals for frequency translating said developed signals;

a reference oscillator;

an arm stretcher transducer coupled to said stylus for imparting motion to said stylus along said groove in response to signals applied thereto;

means for phase comparing signals from said reference oscillator with a color synchronization component of said frequency translated signals to develop error signals indicative of departures from frequency correspondence therebetween;

means, having a first frequency response characteristic, for supplying said error signals from said phase comparing means to said voltage controlled oscillator to establish a first component frequency error correction loop; and

means, coupled to said phase comparing means and having a second frequency response characteristic, for supplying said error signals to said arm stretcher transducer to establish a second component frequency error correction loop;

said first frequency response characteristic differing from said second frequency response characteristic in such manner that correction of frequency errors which recur at said rotational frequency is predominately effected by said second correction loop to the substantial exclusion of said first correction loop, whereas said first correction loop provides significant correction of errors which recur at frequencies in a narrow range below said rotational frequency.

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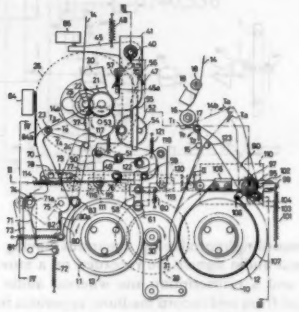
## 3,965,483
## TAPE RECORDING APPARATUS FOR EDITING RECORDING

**Hiroshi Katoh, Yokohama, and Mitsuo Fujita, Tokyo, both of Japan, assignors to Victor Company of Japan, Limited, Yokohama, Japan**

**Filed Apr. 15, 1975, Ser. No. 568,255**
**Claims priority, application Japan, Apr. 15, 1974, 49-40892; Feb. 21, 1975, 50-20830; Feb. 21, 1975, 50-20831; Feb. 21, 1975, 50-20832**
**Int. Cl.² G11B** *27/02, 15/20;* **H04N** *5/78*
**U.S. Cl. 360—14** **8 Claims**



**1.** A tape recording apparatus comprising:

means for transporting a recording tape from a first tape roll over a specific tape travel path to be taken up on a seocnd tape roll;

recodng and reproducing means disposed in a specific position along said tape travel path for recording signals on and reproducing signals from said tape;

means for varying the length of tape in a first part of the tape travel path extending from said recording and reproducing means to said second tape roll, said variation being between a maximum and a minimum tape length;

control mans for controlling said tape length varying means in a manner such that the length of said tape in said first part becomes a maximum during ordinary recording, a minimum during a pause mode preceding an editing recording, and the maximum during said editing;

reversing means for reversing the length of tape to be equal to the difference between said maximum and minimum lengths during said pause, said reversing means acting on a second part of the tape travel path extending from said first tape roll to said recording and reproducing means;

driving means operating during said ordinary recording to drive said tape paid out from said first tape roll and operating during said editing after said pause to drive tape in the second part of the tape travel path, which said second part includes both the tape which was reversed by said reversing means and the tape from said first tape roll contiguous thereto; and

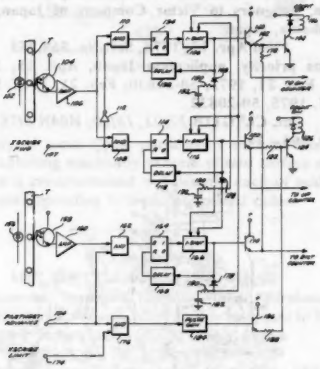
detecting means operating during said editing recording to detect the operational condition wherein the tape portion reversed by said reversing means is driven in traveling motion, and said tape length varying means has assumed substantially a maximum tape length and means responsive to said detecting means for causing edit recording to start.

3,965,484

## CENTRAL DICTATION SYSTEM

Bjorn J. Matz, Forest Hills, N.Y., and Paul F. Rivers, Old Saybrook, Conn., assignors to Dictaphone Corporation, Rye, N.Y.

Filed Jan. 2, 1975, Ser. No. 537,924
Int. Cl.[2] G11B 27/16
U.S. Cl. 360—61 12 Claims



1. In recording/reproducing apparatus having a dictation site whereat audio signals are recorded on a movable record medium, and a transcription site whereat audio signals are reproduced from said record medium, apparatus for providing an indication of the cumulative amount of recorded audio signals awaiting transcription, comprising:

first means for producing first output signals representing the quantity of record medium advanced past said dictation site;

second means for producing second output signals representing the quantity of record medium advanced past said transcription site; and

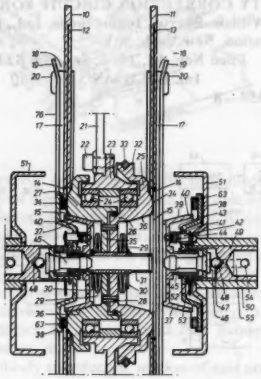
indicating means responsive to said first and second output signals and including output voltage generating means for generating an output voltage representing the net difference between the quantity of record medium advanced past said dictation site and the quantity of record medium advanced past said transcription site, said output voltage being increased in response to said first output signals and decreased in response to said second output signals.

3,965,485

## DRIVE MECHANISM FOR A DISC-SHAPED CODE CARRIER

Ulf Hasso Kennert Morin, Malmo, Sweden, assignor to Aktiebolaget Addo, Malmo, Sweden

Filed Sept. 11, 1974, Ser. No. 505,023
Claims priority, application Sweden, Sept. 13, 1973, 7312475
Int. Cl.[2] G11B 5/81, 17/04, 25/04
U.S. Cl. 360—98 8 Claims



1. Drive mechanism for disc-shaped code carrier having a central opening and which is adapted to co-act with a magnetic head or the like for recording or reading information comprising: a drive element having contact surfaces arranged on opposite sides thereof and adapted to co-act with an adjacent code carrier, means for rotating said drive element, said drive element also being provided with bevelled guide surfaces on opposite locations thereof, and separate centering devices being movable in an axial direction along a line co-extensive with the central axis of said drive element, each of said centering devices having correspondingly bevelled guide surfaces co-acting with a corresponding guide surface of said drive element and with the edge of the code carrier adjacent to said central opening.

# DESIGN PATENTS

## GRANTED JUNE 22, 1976

### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| 025–075 | 240,325 |
| 056–001 R | 240,328 |
| 016–063 | 240,332 |
| 016–060 | 240,333 |
| 016–014 | 240,334 |
| 015–033 | 240,336 |

# DESIGN PATENTS

## GRANTED JUNE 22, 1976

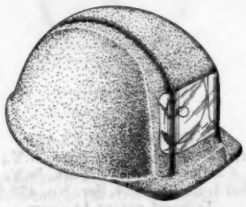
### TERMS

| Yrs CLASS | No. PATENT NO. |
|---|---|
| 023–023 | |
| 059–001 R | |
| 015–067 | |
| 046–060 | |
| 015–014 | |
| 015–023 | |

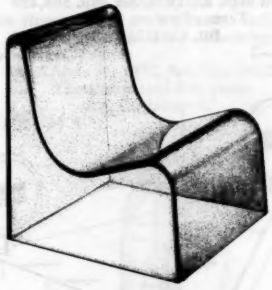
# DESIGNS

JUNE 22, 1976

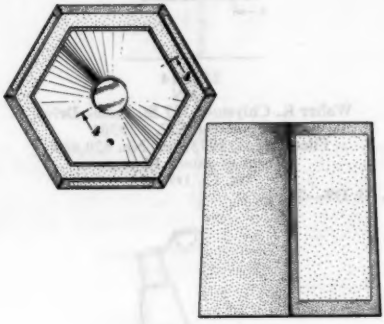
240,310
SAFETY HELMET
Malcolm D. Sinclair, 6201 Park Wood Road, Edina, Minn. 55436, and Andrew S. Fraser, 120 Ashley Road, Hopkins, Minn. 55343
Filed Aug. 30, 1974, Ser. No. 502,035
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—232

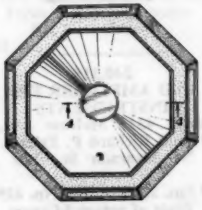


240,311
TOY CHAIR OR SIMILAR ARTICLE
Marion D. Owens, Denver, Colo.
(890 Reed Court, Lakewood, Colo. 80215)
Filed Nov. 13, 1972, Ser. No. 305,904
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—66



240,312
LITTER RECEPTACLE
Leonard M. Yordon, Daytona Beach, Fla., assignor to Repadco Incorporated, Daytona Beach, Fla.
Continuation-in-part of design application Ser. No. 361,647, May 18, 1973, now Patent No. 233,304, dated Oct. 22, 1974. This application Sept. 20, 1974, Ser. No. 507,766
Term of patent 14 years
The term of this patent subsequent to Oct. 22, 1988, has been disclaimed
Int. Cl. D7—*07*
U.S. Cl. D7—194

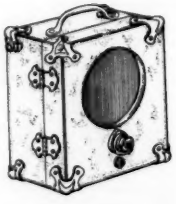




240,313
PLANT POT PACKAGE
George M. Sawyer, 8801 Calico Ave., Garden Grove, Calif. 92641
Filed Nov. 1, 1974, Ser. No. 520,112
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—191

240,314
CAN
Walter K. Chlystun, 327 St. James Drive, Spartanburg, S.C. 29301
Filed Dec. 3, 1973, Ser. No. 420,869
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—218

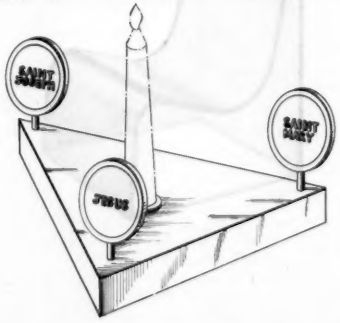
240,315
SPEAKER AND AMPLIFIER FOR MUSICAL INSTRUMENTS
Wayne L. Kimbell, 4319 Melrose Ave., Los Angeles, Calif. 90029, and Richard P. Erlund, San Francisco, Calif. (2248 N. Alvarado St., Los Angeles, Calif. 90039)
Filed Jan. 2, 1974, Ser. No. 429,516
Term of patent 14 years
The term of this patent subsequent to Apr. 30, 1988, has been disclaimed
Int. Cl. D14—*01*
U.S. Cl. D26—14 G



240,316
RELIGIOUS SYMBOL OR THE LIKE
William R. Elliott, 7216 Ainsley St., Fayetteville, N.C. 28304
Filed Aug. 19, 1974, Ser. No. 498,438
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D29—11 C

240,317
WATCH BAND CLASP
Alfred Joseph Durante, Forest Hills, N.Y., assignor to Cartier, Inc., New York, N.Y.
Filed June 12, 1974, Ser. No. 478,589
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D45—4 A

240,318
CANDLE HOLDER
Mary Sovago, 1806 1st Ave., New York, N.Y. 10026
Filed Sept. 23, 1974, Ser. No. 508,458
Term of patent 14 years
Int. Cl. D26—*01*
U.S. Cl. D48—2



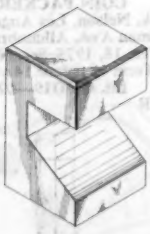
240,319
LAMP BASE
Gilbert P. Hess, 2065 Emporia St., Aurora, Colo. 80010
Filed Apr. 3, 1975, Ser. No. 564,611
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 C

240,320
LUMINAIRE
Eldon L. Anderson, Jr., Fletcher, N.C., assignor to General Electric Company
Filed Sept. 9, 1974, Ser. No. 504,084
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—23 R

240,321
FLASHLIGHT
Jean-Pierre Rousseau, Draveil, France, assignor to Compagnie Industrielle des Piles Electriques (CIPEL), Levallois-Perret, France
Filed Mar. 31, 1972, Ser. No. 240,339
Term of patent 3½ years
Int. Cl. D26—*02*
U.S. Cl. D48—24 A

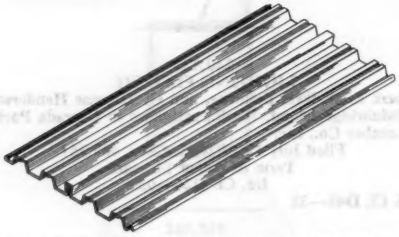
240,322
FLEXIBLE LIGHT
David E. Staub, Clearwater, Fla., assignor to Concept, Inc., Clearwater, Fla.
Filed Mar. 3, 1975, Ser. No. 554,752
Term of patent 14 years
Int. Cl. D26—*02*
U.S. Cl. D48—24 A

240,323
LIGHTING FIXTURE
Robert E. Walker, Bellevue, and G. Thomas Henderson, Bainbridge Island, Wash., assignors to Cascade Pacific Lumber Co., Inc.
Filed July 17, 1974, Ser. No. 489,361
Term of patent 14 years
Int. Cl. D26—*03*
U.S. Cl. D48—31

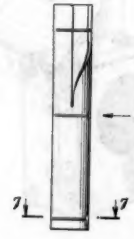


240,324
**DEVICE FOR WASHING APPLICATOR HEADS USED IN RECONDITIONING CAR FINISHES**
Saint Patrick Johnson, Sr., Overland Park, Kans., and Harry J. Brathwaite, Belton, Mo., assignors to Ming of America, Inc., Belton, Mo.
Filed Oct. 31, 1974, Ser. No. 519,609
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D49—11

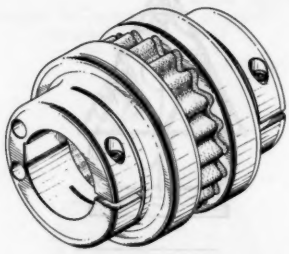
240,325
**RIBBED METAL PANEL**
Donald H. Landis, Pittsburgh, and Richard C. Pfaff, Murrysville, Pa., assignors to Epic Metals Corporation, Braddock, Pa.
Original design application Jan. 15, 1973, Ser. No. 323,912. Divided and this application Feb. 10, 1975, Ser. No. 548,499
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—75



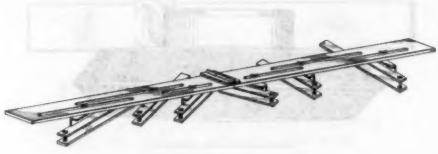
240,326
**COIN PACKER**
Willis A. Nelson, Los Angeles, Calif. (829 N. Stoneman Ave., Alhambra, Calif. 91801)
Filed Feb. 18, 1975, Ser. No. 550,210
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D52—4 R



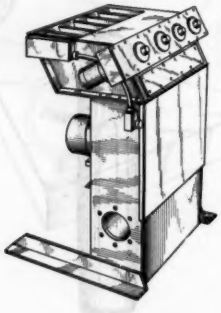

240,327
**FLEXIBLE SHAFT COUPLING**
Lewis E. Baer, Hagerstown, Md., and Carroll G. Wright, Fayetteville, Pa., assignors to T. B. Woods Sons Company, Chambersburg, Pa.
Filed Nov. 8, 1974, Ser. No. 522,305
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D55—1 G



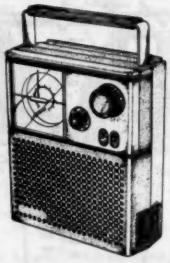
240,328
**PICKUP FOR ADAPTING GRAND PIANO FOR ELECTRIC AMPLIFICATION**
Charles T. Helpinstill II, 6124 Tessamine, Houston, Tex. 77036
Filed July 8, 1974, Ser. No. 486,491
Term of patent 14 years
Int. Cl. D17—*99*
U.S. Cl. D56—1 R



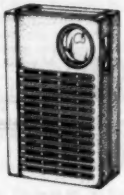
240,329
**FEED GRINDING MILL**
Douglas L. Graham, Auburn, Ind., assignor to Mix-Mill, Inc.
Filed Aug. 12, 1974, Ser. No. 496,712
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D55—1 B



240,330
**RADIO RECEIVER**
Kunio Hoshino, Kadoma, Osaka, and Benito Mishiro, Sakai, Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Osaka, Japan
Filed Oct. 18, 1974, Ser. No. 515,977
Claims priority, application Japan May 11, 1974
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D56—4 B

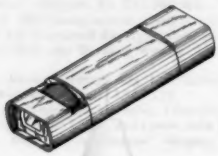


240,331
**RADIO RECEIVER**
Takao Okada, Kyoto Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Osaka, Japan
Filed Dec. 26, 1974, Ser. No. 536,613
Claims priority, application Japan July 3, 1974
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D56—4 B

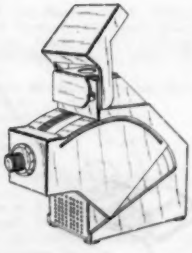


240,332
**BINOCULARS**
Erwin Altenheiner, Hasselborn, Joachim Hornschu, Ober-Kochen, and Volker Dorn, Heidenheim, Germany, assignors to Carl Zeiss-Stiftung, Oberkochen, Germany
Continuation of abandoned design applications Ser. Nos. 427,412 and Ser. No. 427,414, both Dec. 21, 1973. This application July 9, 1974, Ser. No. 486,882
Claims priority, application Germany June 25, 1973
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—63

240,333
**MONOCULAR**
M. Gaines Chesnut, Denver, Colo., assignor to Outdoor Sports Industries, Inc., Denver, Colo.
Filed Nov. 29, 1974, Ser. No. 528,280
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—60



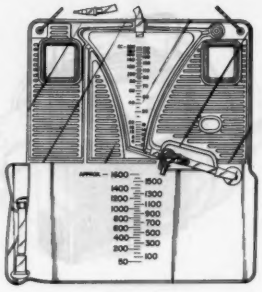
240,334
**MICROFILM PROJECTOR OR THE LIKE**
Richard J. Olson, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Feb. 3, 1975, Ser. No. 546,639
Term of patent 14 years
Int. Cl. D16—*02*
U.S. Cl. D16—14



240,335
**CHAIN CANDLE**
Siegfried Steinhart, Obere Ganshalde 14, 8908 Krumbach, Germany
Original design application Aug. 22, 1972, Ser. No. 282,659, now Patent No. 233,175. Divided and this application July 26, 1974, Ser. No. 492,354
Claims priority, application Germany Feb. 25, 1972; Mar. 10, 1972
Term of patent 14 years
Int. Cl. D26—*01*
U.S. Cl. D73—1 R

240,336
**HOUSING DECK FOR A VIBRATORY COMPACTOR**
Helmut A. Maass, West Bend, Wis., assignor to M-B-W, Inc., Slinger, Wis.
Filed Dec. 23, 1974, Ser. No. 535,319
Term of patent 14 years
Int. Cl. D15—*04*
U.S. Cl. D15—33

240,337
**URINE METERING AND COLLECTION UNIT**
Paul Hanifl, Warwick, R.I., assignor to International Paper Company, New York, N.Y.
Filed Mar. 10, 1975, Ser. No. 557,033
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D83—1 U



240,338
**MULTI-HEAD COMB**
Bernard Suchowski, Marlboro, David D. Lovitz, Short Hills, and Claud W. Kissin, Fort Lee, N.J., assignors to The Hartz Mountain Corporation, Harrison, N.J.
Filed Jan. 30, 1975, Ser. No. 545,628
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D86—8

240,339
**HAIR CURLING IRON**
John L. Benty, Sands Point, N.Y., assignor to The Gillette Company, Boston, Mass.
Filed Jan. 2, 1975, Ser. No. 538,014
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D86—10 E

# LIST OF PATENTEES

## TO WHOM

## PATENTS WERE ISSUED ON THE 22ND DAY OF JUNE, 1976

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A/S Tele-Plan: *See—*
Holmen, Hans Kristian, 3,964,311.

AB Ziristor: *See—*
Pettersson, Leif B., 3,964,617.

Abbott Laboratories: *See—*
Redmer, Wilbert; Rolin, Kenneth; and Nittel, Herman, 3,964,847.
Redmer, Wilbert; Rolin, Kenneth; and Nittel, Herman, 3,964,857.

Abe, Kyoichi, to Rohr Industries, Inc. Wave motion simulator. 3,964,316, Cl. 73-432.0SD.

Abex Corporation: *See—*
Frank, Earl E., 3,964,679.

Abildgaard, William H.; and Groswith, Charles T., III, to Velo-Bind, Inc. Case for book with pressure sensitive resilient spine pad. 3,964,770, Cl. 281-29.000.

Abraham, Edward D. Molding system. 3,964,540, Cl. 164-323.000.

ACF Industries, Incorporated: *See—*
Fitzgerald, John B., 3,964,259.
May, Edward T., 3,964,515.

Ackerly, Robert E.; and Bongartz, Roy C., to Allegheny Ludlum Industries, Inc. Apparatus for supplying current to a moving strip. 3,964,989, Cl. 204-211.000.

Acme Specialty Manufacturing Company: *See—*
Skilliter, Robert T., Jr.; and Pietrowski, Anthony P., 3,964,612.

Adachi, Nokihisa: *See—*
Nishio, Osamu; and Adachi, Nokihisa, 3,964,276.

Adair, John C.: *See—*
Ring, Wallace H.; Adair, John C.; and Elwyn, Richard A., 3,964,488.

Adams, Gary V.; and Minert, Roy T., to Thiokol Corporation. Airdrop canister. 3,964,700, Cl. 244-138.00R.

Adams, Gerald E., to Easy Heat-Wirekraft, MSP Industries Corporation. Heating structure fabricating machine and method. 3,964,959, Cl. 156-433.000.

Adams, John F. Folding luggage carrier. 3,964,762, Cl. 280-439.000.

Adams, John R. Holder assembly for fishing rods and fishing accessories. 3,964,706, Cl. 43-21.200.

Adams, Sally Lee: *See—*
Persinski, Leonard J.; Martin, Fred David; and Adams, Sally Lee, 3,964,921.

Adamson, Michael J.: *See—*
Reinisch, Ronald F.; Gloria, Hermilo R.; Goldsberry, Ronald E.; and Adamson, Michael J., 3,965,096.

Adler, Stanford L.; and Saunders, Alexander M., to Technicon Instruments Corporation. Coating apparatus including liquid sealant between compartments. 3,964,434, Cl. 118-405.000.

Admiral Corporation: *See—*
Chamberlain, Richard Travers, 3,965,393.

Aegidius, Poul Erik, to N.K. Verwaltungs AG. Analytical apparatus for serial determination of nitrogen in samples by the Kjeldahl method. 3,964,869, Cl. 23-253.00R.

Affeldt, Bernard H.: *See—*
Kiraly, Raymond J.; Affeldt, Bernard H.; and Anspach, Charles R., 3,964,416.

Ager, John W.; and Fekete, Thomas M., to FMC Corporation. Continuous process for the esterification of phosphonitrilic chloride polymers. 3,965,219, Cl. 260-973.000.

AGFA-Gevaert, A.G.: *See—*
Sieber, Werner; Ganser, Friedrich; Hammer, Thomas; Viehrig, Wolfgang; Frick, Hans-Dieter; and Osegowitsch, Viktor, 3,964,191.
Wick, Richard; Bestenreiner, Friedrich; Deml, Reinhold; and Helmberger, Josef, 3,965,291.

AGFA-GEVAERT N.V.: *See—*
Janssens, Wilhelmus; Claeys, Daniel Alois; Lemahieu, Raymond Gerard; and Dierckx, Jozef Aime, 3,965,282.
Stievenart, Emile Frans; Van Bouwel, Leo Paul; and Plessers, Hendrik Sylvester, 3,964,107.
Van Besauw, Jan Frans; De Volder, Noel Jozef; Van Engeland, Jozef Leonard; and Poot, Albert Lucien, 3,964,903.

Aggressive Industries Inc.: *See—*
Berquist, DeWayne Donald, 3,964,221.

Agriculture Research Incorporated: *See—*
Stone, G. W. (Charles), 3,964,242.

Ahlen, Karl Gustav, to S.R.M. Hydromekanik Aktiebolag. Torque converter transmission having rotating casing, and releasable pump. 3,964,347, Cl. 74-733.000.

Air Monitor Corporation: *See—*
De Baun, Kenneth W., 3,964,519.

Air Products and Chemicals, Inc.: *See—*
Antonio, Anthony I.; and Guerrero, Fernando V., 3,964,339.
Antonio, Anthony I.; and Guerrero, Fernando V., 3,964,340.
Molina, Orlando G., 3,965,350.

Aktiebolaget Addo: *See—*
Morin, Ulf Hasso Kennert, 3,965,485.

Akzona Incorporated: *See—*
van der Burg, Willem Jacob, 3,965,114.
Werner, Helmut; and Stapp, Hans, 3,964,249.
Zengel, Hans-Georg; and Bergfeld, Manfred, 3,965,172.

Albaret S.A.: *See—*
Paramythioti, Michel; De La Sayette, Emmanuel R.; and Girard, Jacques J., 3,964,834.

Albert, Kenneth J. Drinking receptacle. 3,964,631, Cl. 220-90.400.

Albrecht, Gerhard: *See—*
Soffge, Friedhelm; and Albrecht, Gerhard, 3,964,119.

Albright & Wilson Limited: *See—*
Harris, Glyn Islwyn; and Huckstepp, Brian George, 3,965,211.

Alexander, David John, to Lever Brothers Company. Pressurized dispensing container. 3,964,649, Cl. 222-399.000.

Alexander, Jerry L. Self timing switch. 3,965,465, Cl. 340-274.00R.

Alfred Fischbach KG Kunststoff-Spritzgusswerk: *See—*
Langensiepen, Gert; and Bruning, Werner, 3,964,641.

Alig, Leo: *See—*
Furst, Andor; Muller, Marcel; Alig, Leo; Keller, Peter; Kerb, Ulrich; and Wiechert, Rudolf, 3,965,128.

Allaire, Joseph Paul. Miter table assembly. 3,964,361, Cl. 83-471.300.

Allan, Frank V.; Fenn, John B., Jr.; and Lewis, John H., to Xonics, Inc. X-ray system with electrophoretic imaging. 3,965,352, Cl. 250-315.00A.

Allee Manufacturing, Inc.: *See—*
Lunzer, Leo M.; and Evgen, Allan, 3,964,561.

Allegheny Ludlum Industries, Inc.: *See—*
Ackerly, Robert E.; and Bongartz, Roy C., 3,964,989.

Allen, Carling D. Wheel-support structure in vehicles. 3,964,563, Cl. 180-27.000.

Allen, Clifford H.: *See—*
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Allen, Elaine; and Schrier, Eileen. Eye protective device. 3,964,241, Cl. 54-80.000.

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Amann, August; Bolz, Gerhard; Wiersdorff, Walter-Wielant; Giertz, Hubert; and Wilsmann, Klaus, to BASF Aktiengesellschaft. Carbamates and their use as pharmaceuticals. 3,965,119, Cl. 260-343.30R.

Amann, Bertram: *See—*
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Ammons, Vernon G.; and Vanek, James C., to PPG Industries, Inc. Adhesion control for safety glass laminates via polyurethane composition. 3,965,057, Cl. 260-18.0TN.

Amneus, John Sigfrid, to Procter & Gamble Company, The. Closure. 3,964,670, Cl. 229-51.0ST.

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Anderson, Paul E., to Martin Marietta Aluminum Inc. Apparatus for producing continuous cast metallic sheet with patterned surface. 3,964,963, Cl. 164-277.000.

Anderson, Robert C., to United States of America, Energy Research and Development Administration. Diffusion bonding. 3,964,667, Cl. 228-194.000.

Anderson, William R., Jr. Rifle support. 3,964,613, Cl. 211-64.000.

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Anetseder, Leopold, Sr.; and Anetseder, Leopold, Jr., to Sun-Sor GmbH. Method of and apparatus for detecting light and controlling jalousies and the like. 3,965,348, Cl. 250-233.000.

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Antonio, Anthony I.; and Guerrero, Fernando V., to Air Products and Chemicals, Inc. Hand grip having an inner hub. 3,964,340, Cl. 74-551.900.

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Aramaki, Seigo; Sudo, Katsuzo; Tani, Mitsuo; Sato, Takehiko; Onishi, Yuuji; and Sakaguchi, Nobuhiro, to Mitsubishi Jukogyo Kabushiki Kaisha; and Mitsubishi Petrochemical Company Limited. Heating device having dumbbell-shaped reaction tubes therein. 3,964,873, Cl. 23-277.00R.

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Arika, Mikio: *See—*
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Arimura, Iwao; Sato, Akio; and Hirano, Hironori, to Bridgestone Tire Company Limited. Pneumatic radial type tire having an improved durability in bead section. 3,964,533, Cl. 152-362.00R.

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Armento, Anthony F. High note intensifier for brass musical instruments. 3,964,363, Cl. 84-399.000.

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Arregui, Jose Luis Loidi, to Asteko S/A. Truck for handling containers. 3,964,626, Cl. 214-505.000.

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Artz, Klaus: *See—*
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Asahi Glass Co., Ltd.: *See—*
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Atchisson, Maxwell G. Safety mechanism for a firearm. 3,964,366, Cl. 89-148.000.

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Baak, N. Tryggve E. A.; and Harris, Dwight L., to Cyprus Mines Corporation. Leaching tremolite impurity from talc. 3,965,241, Cl. 423-155.000.

Baar, Walter; Koehler, Herbert; and Muecke, Walter, to Dr. -Ing Rudolf Hell GmbH. Engraving device for a printing form engraving machine. 3,964,382, Cl. 101-1.000.

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Hidy, Phil H.; and Baldwin, Robert S., 3,965,275.
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Balmforth, Ernest Lynn. Game apparatus. 3,964,747, Cl. 273-131.0AB.
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Banks, Ronald Eric; and Haszeldine, Robert Neville, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Novel materials containing nitrogen. 3,965,184, Cl. 260-583.00D.
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Benedict, Charles E., to Wayne H. Coloney Co., Inc. Loom lay drive linkage. 3,964,524, Cl. 139-190.000.

Bengtsson, Sture B., to Robur Konsult AB. Automated handling system for bank deposit boxes. 3,964,577, Cl. 186-1.00R.

Benjamin, Benjamin C., to Schmelzer Corporation. Carburetion system. 3,965,222, Cl. 261-39.00B.

Benjamin, Benjamin C.; and Schautz, Glenn A., to Schmelzer Corporation. Charge forming device. 3,965,223, Cl. 261-39.00B.

Bennett, Stanley W. Telephone system teaching apparatus. 3,964,179, Cl. 35-31.00R.

Bennett, Wilfred Potter, to RCA Corporation. Apparatus for nondestructively testing the voltage characteristics of a transistor. 3,965,420, Cl. 324-158.00T.

Benson, John C.; and Hossfield, George L., Jr., to Allis-Chalmers Corporation. Pole unit mechanism for closing the contacts in an oil circuit breaker. 3,964,338, Cl. 74-520.000.

Benson, William Merle, to FMC Corporation. Expansible operator's cab. 3,964,779, Cl. 296-27.000.

Bentivegna, Pasquale P. Ladder leveling device. 3,964,574, Cl. 182-204.000.

Bergeron, Gaetan G. Ball furniture. 3,964,790, Cl. 297-445.000.

Bergfeld, Manfred: *See—*
Zengel, Hans-Georg; and Bergfeld, Manfred, 3,965,172.

Bergman, John George, Jr.; Crane, Glen Robert; Storey, Raymond Nichols; and Williams, Denise, to Bell Telephone Laboratories, Incorporated. Lithium perchlorate trihydrate nonlinear devices. 3,965,375, Cl. 307-88.300.

Berkenblit, Melvin; and Reisman, Arnold, to International Business Machines Corporation. Chemical polishing of single crystal dielectrics. 3,964,942, Cl. 156-2.000.

Bernard, Armand R.: *See—*
Labadie, Jean Francois; Bernard, Armand R.; de la Taille, Olivier P.; and Thary, Christian, 3,964,787.

Bernhard, Robert, to Aurora Products Corporation. Miniature vehicle with magnetic force. 3,964,206, Cl. 46-251.000.

Berquist, DeWayne Donald, to Aggressive Industries Inc. Platform sections. 3,964,221, Cl. 52-177.000.

Berriman, Lester Porter: *See—*
Englert, Robert D.; Berriman, Lester Porter; Armstrong, Kenneth P.; and Roe, Douglas A., 3,965,221.

Berry, John Franklin, to Hycel, Inc. Reaction container. 3,964,867, Cl. 23-253.00R.

Bertele, Erhard; and Schudel, Peter, to Givaudan Corporation. 4-Methylene-5-hexen-1-ol. 3,965,198, Cl. 260-632.00R.

Bertrand, Henri. Method of and device for opening bivalvular mollusks. 3,964,130, Cl. 17-45.000.

Bessen, Irwin I.; Betts, Robert K.; and Hillery, Robert V., to General Electric Company. Porous high temperature seal abradable member. 3,964,877, Cl. 29-182.000.

Bestenreiner, Friedrich: *See—*
Wick, Richard; Bestenreiner, Friedrich; Deml, Reinhold; and Helmberger, Josef, 3,965,291.

Betts, Robert K.: *See—*
Bessen, Irwin I.; Betts, Robert K.; and Hillery, Robert V., 3,964,877.

Betz Laboratories, Inc.: *See—*
Magnusson, Lawrence B., 3,965,002.

Bevacqua, Louis Albert, to Motorola, Inc. Treadle bar driven potentiometer. 3,965,449, Cl. 334-7.000.

Beyer, Eduard: *See—*
Koch, Peter; and Beyer, Eduard, 3,964,537.

Bialousz, Lorraine R.; Herritt, Ethel R.; Lartigue, Donald J.; and Pitcher, Wayne H., Jr., to Corning Glass Works. Enzyme carrier regeneration. 3,965,035, Cl. 252-412.000.

Biere, Helmut; Ulbrich, Hermann; Kessler, Hans-Joachim; and Redmann, Ulrich; to Schering Aktiengesellschaft. 4-Nitroperhydropyrido[1,2-a][1,4]diazepines. 3,965,103, Cl. 260-293.550.

Biliunas, Leo; and SunPano, Allan. Fish bait device and method. 3,964,201, Cl. 43-4.000.

Bingley, George W.: *See—*
Joslyn, Gerald L.; and Bingley, George W., 3,964,713.

BIO Response Inc.: *See—*
Rose, Sam, 3,964,467.

Bippus, Walter; Gernlein, Hermann; and Simon, Manfred Horst, to Industriewerke Karlsruhe-Augsburg Aktiengesellschaft. Device for manufacturing, filling and sealing containers. 3,964,238, Cl. 53-167.000.

Birtcher Corporation, The: *See—*
Judson, Donald W., 3,964,487.

Birum, Gail H., to Monsanto Company. Urea-phosphorus compounds. 3,965,127, Cl. 260-347.300.

Black, Don. Scaffold supporting device. 3,964,116, Cl. 9-1.700.

Black Products Co.: *See—*
Lau, Erwin M., 3,964,650.

Black, Robin Michael: *See—*
White, Alan Chapman; and Black, Robin Michael, 3,965,112.

Blair, Calvin B.; and Hokr, Donald C., to Kent Manufacturing Co., Inc. Quick change mounting bracket for loader arms. 3,964,622, Cl. 214-145.00A.

Blanchard, Robert L., to Foxboro/Trans-Sonics, Inc. Densimeter. 3,964,317, Cl. 73-453.000.

Blaney, Ted Lee, to Procter & Gamble Company, The. Disposable diaper containing ammonia inhibitor. 3,964,486, Cl. 128-284.000.

Blay, Jorge A., to Celanese Corporation. Recovery of oxidation catalyst metals from adipic acid production. 3,965,164, Cl. 260-531.00R.

Bliss, Robert H., to Gates Rubber Company, The. Apparatus for manufacture of power transmission belts. 3,964,846, Cl. 425-28.00B.

Bloch, Rene; Kedem, Ora; and Lobel, Ester, to E. E. Eljim Ecology Ltd. Controlled drug releasing preparations. 3,965,255, Cl. 424-19.000.

Blum, Helmut: *See—*
Schmadel, Edmund; Jakobi, Gunter; Worms, Karl-Heinz; and Blum, Helmut, 3,965,024.

Boag, James T.; and Morgan, Brian E., to Cobe Laboratories, Inc. Extracorporeal blood circulation system and drip chamber with adjustable blood level. 3,964,479, Cl. 128-214.00R.

Bock, Leland B.: *See—*
Youngkamp, John H., 3,964,621.

Boehringer Mannheim G.m.b.H.: *See—*
Tiedemann, Hugo; Sojka, Bernward; Lange, Hans; Rey, Hans-Georg; and Rieckmann, Peter, 3,964,870.

Boeing Company, The: *See—*
Kim, Duk Hwang, 3,964,982.

Boffardi, Bennett P.; Cook, Michael M.; and Ralston, Paul H., to Calgon Corporation. Scale inhibition and corrosion inhibition. 3,965,027, Cl. 252-180.000.

Boggs, Beryl Aaron; Carr, Robert David; Cary, Lawrence Edward; Forman, Clarence Albert; Murray, Wayne Henry; Peterson, Weldon Herbert; and Montgomery, Everett Gray, to Allied Chemical Corporation. Transfer tail apparatus and method for vertical spindle winder. 3,964,722, Cl. 242-18.0PW.

Bohme, Ekkehard: *See—*
Dolfini, Joseph Edward; Bohme, Ekkehard; and Slusarchyk, William A., 3,965,093.

Boles, Hubert J., to General Tire & Rubber Company, The. Adhesion/-bonding dip for tire reinforcement fabrics. 3,964,950, Cl. 156-110.00A.

Bolz, Gerhard: *See—*
Amann, August; Bolz, Gerhard; Wiersdorff, Walter-Wielant; Giertz, Hubert; and Wilsmann, Klaus, 3,965,119.

Bongartz, Roy C.: *See—*
Ackerly, Robert E.; and Bongartz, Roy C., 3,964,989.

Bongers, Hendrikus-Johannes, to G. Siempelkamp & Co. Apparatus for curing elongate workpieces. 3,964,851, Cl. 425-324.00R.

Bonisch, Horst: *See—*
Henning, Kurt; and Bonisch, Horst, 3,964,804.

Bonn, John William, to CVI Corporation. Rechargeable particulate filter for radioactive contaminated gas streams. 3,964,890, Cl. 55-479.000.

Bonnevaux, Henry: *See—*
Pomeret, Jean-Claude; and Bonnevaux, Henry, 3,964,182.

Booth, Frank B., to Union Oil Company of California. Hydrocarbonylation process. 3,965,192, Cl. 260-598.000.

Borbas, Robert A.; Dufton, John P.; Foster, James H.; and Siegel, Jeffrey W., to GTE Automatic Electric (Canada) Limited. Central processor for a telephone exchange. 3,965,458, Cl. 340-172.500.

Borden, Inc.: *See—*
Snow, Harold F., 3,964,131.

Borg-Warner Corporation: *See—*
Mickus, Frank, 3,964,326.
Schober, Michael A., 3,964,737.
Wang, Ting M.; Richardson, Walter H., deceased; and Richardson, Gregory R., administrator, 3,964,587.

Borodin, Daniel J.; and Tolliver, Wilbur E., to New York Wire Mills Corporation. Pipe cage end forming machine and method. 3,964,285, Cl. 72-69.000.

Borodin, Daniel J.: *See—*
Tolliver, Wilbur E.; and Borodin, Daniel J., 3,964,938.

Boser, Ronald J.; and Gluckin, Gerald. Elastic inserter for a sewing machine. 3,964,410, Cl. 112-121.260.

Boshers, William A.: *See—*
Britz, William J.; Boshers, William A.; and Kaufmann, James J., 3,964,928.

Bosshard, Ernst, to Sulzer Brothers Limited. Irradiation plant having a common closure. 3,965,359, Cl. 250-432.00R.

Bottoms, Harry Simister; and Holliday, Leslie, to Joseph Lucas (Industries) Limited. Centrifugal pumps. 3,964,885, Cl. 55-203.000.

Boultinghouse, George, to Boultinghouse, Harold D., a part interest. Method of expanding coins for decorative purposes. 3,964,284, Cl. 72-54.000.

Boultinghouse, Harold D.: *See—*
Boultinghouse, George, 3,964,284.

Bowden, Charles J.: *See—*
Smith, William E.; and Bowden, Charles J., 3,964,566.

Bowen, David, Jr.: *See—*
Fisher, Don E.; Knauff, Paul A.; and Bowen, David, Jr., 3,964,724.

Boyd, Harold B. Marine fender. 3,964,422, Cl. 114-219.000.

Boyd, Lawrence C., Jr.; Kelm, Everett F.; and Randall, John C., to Corning Glass Works. Method and apparatus for evaporating and separating multiple component solutions or mixtures. 3,965,005, Cl. 210-96.00R.

Boyd, Leonard E. Tongs. 3,964,775, Cl. 294-16.000.

Bozek, John S., to Continental Can Company, Inc. Closure with a slotted pull tab. 3,964,632, Cl. 220-270.000.

Brand, Albertus, to B.V. Houtindustrie"De Phoenix". Pallet of synthetic material. 3,964,400, Cl. 108-51.000.

Brand, Gunter: *See*—
Kalippke, Harald; and Brand, Gunter, 3,964,453.

Brands, Henry J.: *See*—
Sterman, Albert P.; Brands, Henry J.; and Weissborn, Frederick W., Jr., 3,965,066.

Brandt, Arnold W., to Burroughs Corporation. Electronic peak sensing digitizer for optical tachometers. 3,965,430, Cl. 328-20.000.

Brane, Ralph M.: *See*—
Yurcheshen, Michael; Levine, Morris; and Brane, Ralph M., 3,965,058.

Braun, Emil: *See*—
Heusler, Helmut; Braun, Emil; and Hofling, Peter, 3,964,596.

Braun, Hans: *See*—
Fetzer, Helmut; Braun, Hans; Cieslok, Gunter; and Rasenberger, Otto, 3,964,357.

Brcic, Stanko: *See*—
Towle, Allistair; and Brcic, Stanko, 3,965,443.

Breitling, Ulrich, to Krauss-Maffel Aktiengesellschaft. Magnetic-suspension vehicle system having switch tracks. 3,964,398, Cl. 104-148.0MS.

Bremer, Richard J., to General Motors Corporation. Adaptive anti-lock brake control apparatus. 3,964,796, Cl. 303-21.0BE.

Bridgestone Tire Company Limited: *See*—
Arimura, Iwao; Sato, Akio; and Hirano, Hironori, 3,964,533.

Brie, Michel; and Riess, Gerard, to Commissariat a l'Energie Atomique. Method of manufacture of composite materials consisting of carbon fibers and resin and materials manufactured in accordance with said method. 3,964,952, Cl. 156-296.000.

Brinkmann, Jurgen; and Saul, Wilhelm, to Varta Batterie Aktiengesellschaft. Drying of storage battery plates. 3,965,321, Cl. 219-10.410.

Brisk, Richard A., to Arthur D. Little, Inc. Digital light responsive switching circuit. 3,965,388, Cl. 315-155.000.

Britax (London) Limited: *See*—
Burleigh, David William, 3,964,798.

British Iron and Steel Research Association, The: *See*—
Stubbs, Dennis; Maltby, Jack; and Oxlade, Roy Ronald, 3,964,282.

British Steel Corporation: *See*—
Stubbs, Dennis; Maltby, Jack; and Oxlade, Roy Ronald, 3,964,282.

Britz, William J.; Boshers, William A.; and Kaufmann, James J. Lead-oxygen DC power supply system having a closed loop oxygen and water system. 3,964,928, Cl. 136-86.00A.

Brixy, Heinz, to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung. Temperature-measuring instrument. 3,964,314, Cl. 73-359.00R.

Broaster Co., The: *See*—
Luebke, Clem J.; Beck, Norman L.; and Daniels, Lowell W., 3,964,637.

Brod, William F. Purse kit. 3,964,529, Cl. 150-32.000.

Brodsky, Larry: *See*—
Jureit, John Calvin; Leutwyler, Roy; Brodsky, Larry; Kushner, Benjamin; Seipos, Andrew G.; and Castillo, Adolfo, 3,964,663.

Bronson, Barry Steven, to Hewlett-Packard Company. Logic pulser. 3,965,468, Cl. 340-349.000.

Brouwer, Walter G.; MacPherson, Edwin J.; Ames, Ronald B.; and Neidermyer, Robert W., to Uniroyal, Inc. Oxadiazole benzoic acid derivatives as herbicides. 3,964,896, Cl. 71-92.000.

Brown, Donald R., to General Motors Corporation. Valve control mechanism. 3,964,455, Cl. 123-90.430.

Brown, John J.; Milholen, William F.; and Lineberry, Cletue E. Method and apparatus for arranging bricks into proper row size for stacking and packaging. 3,964,597, Cl. 198-21.000.

Brown, Kenneth Jewett. Dog or animal toilet. 3,964,437, Cl. 119-1.000.

Brown, Lyman J., to Bates Printing Specialties, Inc. Jigsaw puzzle paint set. 3,964,750, Cl. 273-157.00R.

Brown Oil Tools, Inc.: *See*—
Slator, Damon T., 3,964,552.

Browning, Wayne L., to United States of America, Navy. Waveguide isolator with damping means. 3,965,448, Cl. 333-98.00R.

Brummer, Wolfgang: *See*—
Banauch, Dieter; Brummer, Wolfgang; Ebeling, Wolfgang; Helger, Roland; Hennrich, Norbert; and Lang, Hermann, 3,964,974.

Bruning, Werner: *See*—
Langensiepen, Gert; and Bruning, Werner, 3,964,641.

Brunner, Donald G., to Budd Company, The. Apparatus for metal casting. 3,964,541, Cl. 164-323.000.

Brynsvold, Glen V.; and Snyder, Harold J., Jr., to United States of America, Energy Research and Development Administration. Internal core tightener. 3,964,969, Cl. 176-87.000.

Bucksch, Manfred, to Zahnradfabrik Friedrichshafen AG. Speed-changing system with two fluid-actuated clutches. 3,964,584, Cl. 192-87.110.

Bucyrus-Erie Company: *See*—
Stoner, Thomas A., 3,965,407.

Budd Company, The: *See*—
Brunner, Donald G., 3,964,541.

Budich, Wolfgang; Krah, Robert; and Theissen, Hans, to Dynamit Nobel Aktiengesellschaft. Plastic-encased metallic hollow profile member. 3,964,231, Cl. 52-727.000.

Bullock, Jonathan S.; Harper, William L.; and Peck, Charles G., to United States of America, Energy Research and Development Administration. Electromarking solution. 3,964,914, Cl. 106-19.000.

Bullock, Norman J.; Wendt, Frank A.; DePas, Laddie A.; and Goodman, Walter P., to W. M. Cissell Manufacturing Company. Seam-busting apparatus and method. 3,964,185, Cl. 38-14.000.

Bunde Glass GmbH: *See*—
Hennings, Werner, 3,964,627.

Burgess, Ralph D., Jr., to Food Engineering Corporation. Flesh and skin separating apparatus and method for fruit and vegetable products. 3,964,715, Cl. 241-7.000.

Burgoon, Jack L., to Scott & Fetzer Company, The. Apparatus for treating floor coverings. 3,964,925, Cl. 134-21.000.

Burke, Richard Lerda: *See*—
Giordano, Annie Sue; Burke, Richard Lerda; and Wixon, Harold Eugene, 3,965,014.

Burke, Robert L.: *See*—
Guditz, Elis A.; and Burke, Robert L., 3,965,277.

Burkoth, Terry L.: *See*—
Packard, Martin E.; Ullman, Edwin F.; and Burkoth, Terry L., 3,965,144.

Burleigh, David William, to Britax (London) Limited. Safety belt anchorages. 3,964,798, Cl. 303-1.00A.

Burnop, Victor Charles Ernest; and Watkins, Ronald Charles, to Exxon Research and Engineering Company. Lubricating oil compositions. 3,965,017, Cl. 252-33.300.

Burroughs Corporation: *See*—
Brandt, Arnold W., 3,965,430.

Burrus, Thomas William, to RCA Corporation. Velocity correction circuit for video discs. 3,965,482, Cl. 358-8.000.

Burton, Dennis Ray: *See*—
Owens, Malcolm P.; Barnes, Edgar E.; and Burton, Dennis Ray, 3,964,721.

Burton, Donald E.: *See*—
Hogg, James W.; and Burton, Donald E., 3,964,606.

Burton, Parsons and Company, Inc.: *See*—
Holcombe, Frank O., Jr., 3,965,063.

Busch, Hans Jochen: *See*—
Schippers, Heinz; Bauer, Karl; Lenk, Erich; Mayer, Manfred; and Busch, Hans Jochen, 3,964,723.

Buschmann, Karl; Diem, Hans; Matthias, Guenther; and Wodtcke, Friedrich, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Process for the production of formaldehyde. 3,965,195, Cl. 260-603.0HF.

Bush, Roberta F. Garment fitting aid. 3,964,169, Cl. 33-15.000.

Busi, Giovanni; and Belli, Pierluigi, to Officina Meccanica Giovanni Busi. Terry loop forming instrument for circular knitting machine. 3,964,275, Cl. 66-91.000.

Busse, Walter, to Maschinenfabrik Augsburg-Nurnberg AG. Method for dosing a locking agent into a threaded hole. 3,964,948, Cl. 156-91.000.

Butler, Steven J.; Clawson, Arthur Harley, Jr.; and Ward, Robert Jackie, to P. R. Mallory & Co., Inc. Beam leaded device welding machine. 3,964,664, Cl. 228-6.00A.

Butter, Stephen Allan; and Kaeding, Warren William, to Mobil Oil Corporation. Methylation of toluene. 3,965,208, Cl. 260-671.00M.

Butter, Stephen Allan; and Young, Lewis Brewster, to Mobil Oil Corporation. Selective production of para-xylene. 3,965,209, Cl. 260-671.00M.

Buxton, Thomas S.: *See*—
Hujsak, Karol L.; and Buxton, Thomas S., 3,964,547.

B.V. Houtindustrie"De Phoenix": *See*—
Brand, Albertus, 3,964,400.

C. Evans & Sons Limited: *See*—
Gostling, Peter Eric, 3,964,575.

C. Hager & Sons Hinge Manufacturing Company: *See*—
Peterson, Francis C., 3,964,207.

Cagle, Wesley J.; and Hodge, Ronald F., to John Blue Company Division of Subscription Television, Inc. High clearance vehicle wheel spacing adjustment. 3,964,565, Cl. 180-70.00R.

Calcagno, Benedetto: *See*—
Console, Luciano; Chiellini, Enzo; and Calcagno, Benedetto, 3,965,079.

Calgon Corporation: *See*—
Boffardi, Bennett P.; Cook, Michael M.; and Ralston, Paul H., 3,965,027.
Persinski, Leonard J.; Martin, Fred David; and Adams, Sally Lee, 3,964,921.

California Institute of Technology: *See*—
Shair, Frederick H.; Simmonds, Peter G.; Leighton, Robert B.; and Drivas, Peter J., 3,964,294.

Cambon, Aime; Giovannoni, Claude; Pastor, Raphael; and Riess, Jean, to Produits Chimiques Ugine Kuhlmann. Perfluoroalkyl benzodiazepines. 3,965,092, Cl. 260-239.0BD.

Camid Intermatic: *See*—
Carnegie, Frank, Jr., 3,964,850.

Campbell, Lewis B.; Huffman, Robert E.; and Jones, Robert L., to General Motors Corporation. Energy absorber. 3,964,578, Cl. 188-1.00C.

Canadian Patents and Development Limited: *See*—
Xanthos, Marinos; and Woodhams, Raymond T., 3,965,284.

Canon Kabushiki Kaisha: *See—*
Tanaka, Hidetoshi; Kasamura, Toshiro; and Sato, Tadashi, 3,964,827.

Canton Textile Mills, Inc.: *See—*
Jones, Louis L., Jr.; and Wood, William J., 3,965,401.
Sullins, John K., 3,964,991.

Caprio, Lawrence A.: *See—*
Gerson, Ronald L.; and Caprio, Lawrence A., 3,964,162.

Carbonneau, Gordon S., to Carbonneau Industries, Inc. Linear force generator. 3,965,377, Cl. 310-14.000.

Carbonneau Industries, Inc.: *See—*
Carbonneau, Gordon S., 3,965,377.

Carlsen, Ove Christian: *See—*
Fusco, Vito A.; Carlsen, Ove Christian; and Wright, Steven F., 3,964,147.

Carlsmith, Lawrence A., to Ingersoll-Rand Company. Gaseous reaction apparatus and processes including a peripheral gas receiving chamber and a gas recirculation conduit. 3,964,962, Cl. 162-236.000.

Carlson, James E., to Long Enterprises. Deep sea diving speech converter. 3,965,298, Cl. 179-1.0SH.

Carlson, Paul A., to Wagner Electric Corporation. Automatic reference level adjustment circuit. 3,965,373, Cl. 307-264.000.

Carnegie, Frank, Jr., to Camid Intermatic. Thermoplastic sheet pressure forming machine. 3,964,850, Cl. 425-292.000.

Carnielli, Guido. Physiological active and passive exercising apparatus. 3,964,742, Cl. 272-73.000.

Carpano & Pons S.A.: *See—*
Chauvigne, Michel, 3,964,685.

Carr, Albert A.; and Kinsolving, C. Richard, to Richardson-Merrell Inc. Compositions and methods for the treatment of the symptoms of histamine induced allergic reactions. 3,965,257, Cl. 424-45.000.

Carr, Guy Crockett. Method for impregnating wood. 3,964,863, Cl. 21-7.000.

Carr, Robert David: *See—*
Boggs, Beryl Aaron; Carr, Robert David; Cary, Lawrence Edward; Forman, Clarence Albert; Murray, Wayne Henry; Peterson, Weldon Herbert; and Montgomery, Everett Gray, 3,964,722.

Carrier Corporation: *See—*
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Carter's Ink Company, The: *See—*
Cohen, Norman B.; and Lennon, Donald J., 3,964,832.
Maxwell, James C., 3,964,388.

Cary, Lawrence Edward: *See—*
Boggs, Beryl Aaron; Carr, Robert David; Cary, Lawrence Edward; Forman, Clarence Albert; Murray, Wayne Henry; Peterson, Weldon Herbert; and Montgomery, Everett Gray, 3,964,722.

Casadio, Roberto. Cable stripper. 3,964,350, Cl. 81-9.50A.

Casey, Thomas P., to Caterpillar Tractor Co. Apparatus for forming a groove and back-up dam for welds. 3,964,287, Cl. 72-210.000.

Casio Computer Co., Ltd.: *See—*
Kashio, Toshio, 3,964,592.

Castelijns, Adrianus Petrus Johannes: *See—*
Asselman, George Albert Apolonia; Green, David Bruce; Castelijns, Adrianus Petrus Johannes; Naastepad, Pieter Aart; and De Ruiter, Jacob Willem, 3,965,334.

Castillo, Adolfo: *See—*
Jureit, John Calvin; Leutwyler, Roy; Brodsky, Larry; Kushner, Benjamin; Seipos, Andrew G.; and Castillo, Adolfo, 3,964,663.

Catanzarite, Vincent Owen, to Specialty Products Development Corporation. Method of inflating an automobile passenger restraint bag. 3,964,255, Cl. 60-205.000.

Caterpillar Tractor Co.: *See—*
Casey, Thomas P., 3,964,287.
Eftefield, Larry G.; and Wirt, Leon A., 3,964,803.
Shankwitz, Robert F.; and Garman, Anthony L., 3,964,152.
Swanson, Fred T., 3,964,797.

Cattermole, David Christopher, to Elliott Brothers (London) Limited. Partially rotated fastener comprising circular fastener halves captured in complementary cavity. 3,964,511, Cl. 137-614.060.

Cauquelin, Yves Bernard: *See—*
Gourlandt, Albert Joseph; Gourlandt, Georges Charles; Cauquelin, Yves Bernard; and Lafon, Jean Francois, 3,964,481.

Celanese Corporation: *See—*
Blay, Jorge A., 3,965,164.
Levy, Leon B., 3,965,166.

Celio, Tino: *See—*
Degenhardt, Gunter; and Celio, Tino, 3,964,193.

Ceraver: *See—*
Willem, Michel, 3,964,536.

Cervenka, Juraj; and Olesovsky, Jaroslav, to Prvni Brnenska strojirna. Additional device for an automatic welding equipment for fully welded tube walls. 3,964,665, Cl. 228-44.10R.

Cesca, Sebastiano: *See—*
Priola, Aldo; Cesca, Sebastiano; and Ferraris, Giuseppe, 3,965,078.

Ceskoslovenska akademie ved: *See—*
Hradil, Jiri; Coupek, Jiri; Krivakova, Miroslava; Stamberg, Jiri; Stoy, Arthur; and Turkova, Jaroslava, 3,964,973.
Stoy, Artur; Stoy, Vladimir; Urbanova, Renata; Prokop, Jaroslav; and Kucera, Josef, 3,965,227.

Ceyzeriat, Louis; and Letoffe, Michel, to Rhone-Poulenc S.A. Use of organopolysiloxane compositions which cure at ambient temperature in coating electrical and electronic devices. 3,965,280, Cl. 427-126.000.

Chabala, Leonard V.; and Meister, Otto, to S & C Electric Company. Exhaust control device for circuit interrupting devices. 3,965,452, Cl. 337-280.000.

Chamberlain, Richard Travers, to Admiral Corporation. Television X-radiation protection device and circuit. 3,965,393, Cl. 317-16.000.

Champion Spark Plug Company: *See—*
Gimple, James J., 3,964,683.

Chandross, Edwin Arthur; Robbins, Murray; and Schonhorn, Harold, to Bell Telephone Laboratories, Incorporated. Bodies including passivated metal particles. 3,964,939, Cl. 148-105.000.

Chang, Zung S.; Howitt, John S.; and VanDewoestine, Robert V., to Corning Glass Works. Swirl exhaust gas flow distribution for catalytic conversion. 3,964,875, Cl. 23-288.0FC.

Chaplits, Donat Nikolaevich; Kazakov, Vladimir Pavlovich; Lazariants, Emmanuil Gabrielovich; Chebotaev, Vladimir Filippovich; Balashov, Mikhail Ivanovich; and Serafimov, Leonid Antonovich. Ion-exchange molded catalyst and method of its preparation. 3,965,039, Cl. 252-426.000.

Chapman, Lael Ogden. Insulated closures for attic fans, and seals therefor. 3,964,377, Cl. 98-116.000.

Charlin, Andre Marie Bernard. Methods and devices for recording, engraving and reproducing modulated information in tetraphony. 3,964,752, Cl. 274-46.00R.

Chatterjea, Probir K., to International Harvester Company. Clutch cylinder circuit and charging valve therefor. 3,964,372, Cl. 91-471.000.

Chaudhari, Praveen; Cuomo, Jerome J.; and Gambino, Richard J., to International Business Machines Corporation. Apparatus using amorphous magnetic compositions. 3,965,463, Cl. 340-174.0TF.

Chauvigne, Michel, to Carpano & Pons S.A. Lawn sprinkling and similar installations. 3,964,685, Cl. 239-66.000.

Chavanoz S.A.: *See—*
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Chebotaev, Vladimir Filippovich: *See—*
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Ching, Larry K. W., Jr.; and Coleman, Charles E., to Gates Rubber Company, The. High discharge capability sealed through connector. 3,964,934, Cl. 136-135.00R.

Chinoin Gyogyszer-es Vegyeszeti Termekek Gyara RT: *See—*
Toth, Geza; Szabo, Gabor; Eibel, Gyorgy; and Somfai, Eva, 3,964,894.

Chion, Pierre; and Cuidard, Robert, to Rhone-Poulenc-Textile. Process for the obtaining of poly(vinylidene fluorine) yarns and fibers. 3,965,232, Cl. 264-184.000.

Chisdes, David M., to Beckman Instruments, Inc. Determination of sodium form water softener breakthrough. 3,964,999, Cl. 210-23.00R.

Christen Incorporated: *See—*
Christen, Louis J., Jr.; and Latal, John J., 3,964,373.

Christen, Louis J., Jr.; and Latal, John J., to Christen Incorporated. Paper log roller. 3,964,373, Cl. 93-1.00C.

Christensen, Sofus Georg. Plate-shaped module units. 3,964,224, Cl. 52-387.000.

Chu, Chin-Chiun, to Mobil Oil Corporation. Selective production of para-xylene and catalyst therefor. 3,965,210, Cl. 260-671.00M.

Chubb, Francis L.; and Eric, Lucien. Process for preparing p-(5-chloro-2-methoxy-benzamidoethyl)-benzene sulfonamide. 3,965,173, Cl. 260-556.0AR.

Chumachenko, Vasily Sergeevich: *See—*
Krupman, Leonid Isaakovich; Okonishnikov, Ary Mikhailovich; Sochnev, Alexandr Egorovich; Gavronsky, Boris Viktorovich; Popov, Viktor Alexeevich; Kalashnik, Anatoly Nikolaevich;

Chumachenko, Vasily Sergeevich; Gudkevich, Veniamin Mikhailovich; Panev, Georgy Alexeevich; Detochka, Vasily Ivanovich; Telesov, Savely Adolfovich; Pokrass, Leonid Moiseevich; Ofengenden, Abram Mikhailovich; Nesterovich, Raisa Petrovna; and Zhitnik, Georgy Gavrilovich, 3,964,900.

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City of Hope-A National Medical Center: *See—*
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Clawson, Arthur Harley, Jr.: *See—*
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Cleary, Robert A.: *See—*
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Cleland, Ernest K.: *See—*
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Clemens, Carl F.; and Lenhard, M. James, to Xerox Corporation. Electrostatographic toners using block copolymers. 3,965,021, Cl. 252-62.10P.

Cless, Gerhard; and Kaplan, Edward L., to Extel Corporation. Tape punch machine. 3,964,673, Cl. 234-115.000.

Clifford, Graham Frank; and Spurrier, Mack W., to Gaston County Dyeing Machine Company. Method for transferring yarn packages from a winding tube to a core for dyeing. 3,964,153, Cl. 29-427.000.

Clinard, Glenn G.; Guth, Kenneth C.; Mulhollam, Gail R.; and Volk, Frank J., to United States of America, Air Force. Pulse analyzer for an RF moving target detector. 3,965,470, Cl. 343-5.0PD.

Coackley, Robert; Urquhart, John Reid; and Dack, David George, to Hewlett-Packard Limited. Method and apparatus for tracking an incrementally sweeping generator by a frequency selective receiver. 3,965,424, Cl. 325-363.000.

Cobe Laboratories, Inc.: *See—*
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Coenen, Clayton J. Apparatus for tying bundles. 3,964,381, Cl. 100-34.000.

Cohee, Claude C.: *See—*
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Cohen, Harvey K.: *See—*
Conn, Arnold; and Cohen, Harvey K., 3,965,007.

Cohen, Noal; Rosenberger, Michael; and Saucy, Gabriel, to Hoffmann-La Roche Inc. Steroid total synthesis process utilizing a cyanoalkyl A-ring precursor. 3,965,138, Cl. 260-464.000.

Cohen, Norman B.; and Lennon, Donald J., to Carter's Ink Company, The. Gel composition and adhesive stick. 3,964,832, Cl. 401-75.000.

Cole-Hersee Company: *See—*
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Cole, Richard W., Jr.: *See—*
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Coleman, Charles E.: *See—*
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Colgate-Palmolive Company: *See—*
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Giordano, Annie Sue; Burke, Richard Lerda; and Wixon, Harold Eugene, 3,965,014.
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Collins, Paul W.; and Pappo, Raphael, to G. D. Searle & Co. 16-Oxygenated prostanoic acid derivatives. 3,965,143, Cl. 260-468.00D.

Colt Industries Operating Corporation: *See—*
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Cominco Ltd.: *See—*
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Hidy, Phil H.; and Baldwin, Robert S., 3,965,275.
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Computer Identics Corporation: *See—*
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Conn, Arnold; and Cohen, Harvey K. Protein skimmer. 3,965,007, Cl. 210-169.000.

Connick, Francis G., to Swift & Company. Canned food recyclable thermal simulator. 3,964,313, Cl. 73-343.00B.

Conroy, Andrew, to Lawrence Peska Associates, Inc., a part interest. Suspended ceiling leveling device. 3,964,710, Cl. 248-206.00R.

Console, Luciano; Chiellini, Enzo; and Calcagno, Benedetto, to Societa' Italiana Resine S.I.R. S.p.A. Separation and recovery of products obtained in catalytic processes of preparing acrylonitrile polymers or copolymers. 3,965,079, Cl. 526-68.000.

Consolidation Coal Company: *See—*
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Constant, James Nickolas. Digital FFT processor using random access memory. 3,965,342, Cl. 235-156.000.

Constant, James Nickolas. Off-resonant chaff system for a large target viewed by low frequency radar. 3,965,472, Cl. 343-18.00E.

Continental Can Company, Inc.: *See—*
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Harrington, Frank C., 3,965,271.

Continental Oil Company: *See—*
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Coon, James A. Handle for hollow file. 3,964,143, Cl. 29-80.000.

Copal Company Limited: *See—*
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Coppage, Thomas B.; Flier, Ronald J.; and Payne, Bernard M., to Ralston Purina Company. Canned expanded protein lattice food product. 3,965,259, Cl. 426-90.000.

Corcelle, Francois; and Courjaud, Jacques, to Commissariat a l'Energie Atomique. Welding by electron bombardment. 3,965,326, Cl. 219-121.0EB.

Cordeiro, Rodney R.: *See—*
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Cordem Corporation: *See—*
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Cortese, Anthony M. Stance control supports for, and combination thereof with, a golf shoe. 3,964,180, Cl. 36-135.000.

Coscia, Charles M., to Bendix Corporation, The. Closed loop fast idle control system. 3,964,457, Cl. 123-119.00F.

Cosden Technology, Inc.: *See—*
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Watson, James M., 3,964,979.

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Coupek, Jiri: *See—*
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Cox, John A., Jr., to Ideal Industries, Inc. Connector for flexible metallic conduit and method. 3,964,772, Cl. 285-39.000.

Cram, Donald J., to University of California, The Regents of the. Multioxymacrocycles. 3,965,116, Cl. 260-338.000.

Crane, Glen Robert: *See—*
Bergman, John George, Jr.; Crane, Glen Robert; Storey, Raymond Nichols; and Williams, Denise, 3,965,375.

Craven, George Frederick; Heeks, John Stuart; and Marshall, Graham, to International Standard Electric Corporation. Surface acoustic wave filter. 3,965,446, Cl. 333-72.000.

Crawford, Alexander; and Bailey, Alfred J., to Massey-Ferguson Services N.V. Material unloading implements. 3,964,714, Cl. 239-662.000.

Crawford, Thomas A., to Midwest-Precision Corporation. Sealed caster. 3,964,124, Cl. 16-21.000.

Crego, John B.; Cowan, Everett C., Jr.; Riffanacht, John D.; Knepper, Larimer J.; and Rowland-Hill, Edward W., to Sperry Rand Corporation. Projections on rotor auger of axial flow combine. 3,964,492, Cl. 130-27.00T.

Cressman, Paul J.; Limburg, William W.; and Pilato, Louis A., to Xerox Corporation. Polymerization imaging. 3,965,276, Cl. 427-12.000.

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Cuomo, Jerome J.: *See—*
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Cusic, John W.; Ellefson, Charles R.; and Woo, Chi Min, to G. D. Searle & Co. 1-(Substituted-aminoalkyl)-3-benzoyl-4-hydroxy-4-phenylpiperidines and related compounds. 3,965,104, Cl. 260-293.640.

CVI Corporation: *See—*
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Cyprus Mines Corporation: *See—*
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Dacom, Inc.: *See—*
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Dahlberg, Alf-Coran; Hogberg, Karl Gustav; Lindvall, Sven; and Rydh, Thore Oskar Verner, to Astra Lakemedel Aktiebolag. Polymer. 3,965,133, Cl. 260-439.00R.

Dahms, Harald. Method and apparatus for measuring $CO_2$, $O_2$, and Cl in body fluids. 3,964,864, Cl. 23-230.00B.

Dai Nippon Insatsu Kabushiki Kaisha: *See—*
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Daimler-Benz Aktiengesellschaft: *See—*
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D'Angelo, Antonio Joseph; Mageli, Orville Leonard; and Sheppard, Chester Stephen, to Pennwalt Corporation. Coupled peroxides. 3,965,145, Cl. 260-471.00C.

Daniels, Dennis, to U.S. Amada, Ltd. Air cushion sheet support. 3,964,355, Cl. 83-169.000.

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Dart Industries Inc.: *See—*
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Das, Manik L., to Sigma Chemical Company. Lyophilized human hemoglobin standard for colorimetric determination of total hemoglobin. 3,964,865, Cl. 23-230.00B.

Das, Narayan, to Amchem Products, Inc. Coating solution for metal surfaces. 3,964,936, Cl. 148-6.270.

Daubenberger, Charles B.; and Daubenberger, Charles J., to Da/Pro Rubber, Inc. Check valve. 3,964,509, Cl. 137-525.100.

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Davis, Earl K.; Hansen, Kent W.; and Silvis, Duane C., to Motorola, Inc. Solder glass composition and method of using same for encapsulating devices. 3,964,920, Cl. 106-53.000.

Davis, Robert Bruce, to Union Carbide Corporation. Cryopulverizing and post-treatment of flavoring materials. 3,965,267, Cl. 426-273.000.

Davis, Rufus Furman, Jr.: *See—*
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Dawson, Chester H., to Remington Arms Company, Inc. Method and machine for straightening and tensioning saw blades. 3,964,348, Cl. 76-26.000.

Dawson, Gerald C. Portable water sterilization device. 3,965,008, Cl. 210-192.000.

Day, Robert H., to Illinois Tool Works Inc. Vacuum moulding techniques. 3,964,856, Cl. 425-503.000.

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Dean, Leslie Byron, II. Sleeping bag suspension system. 3,964,113, Cl. 5-121.000.

Dearling, Harry S. Spray dispensing device. 3,964,647, Cl. 222-174.000.

De Baun, Kenneth W., to Air Monitor Corporation. Fluid velocity equalizing apparatus. 3,964,519, Cl. 138-37.000.

Deering Milliken Research Corporation: *See—*
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Deerkoski, Leonard F.; and Schmidt, Richard F., to United States of America, National Aeronautics and Space Administration. Switchable beamwidth monopulse method and system. 3,965,475, Cl. 343-854.000.

Deffeyes, Robert J., to Graham Magnetics Incorporated. Process of making metal powders and products produced thereby. 3,965,046, Cl. 252-472.000.

Degenhardt, Gunter; and Celio, Tino, to Gretag Aktiengesellschaft. Apparatus for simultaneously viewing DIA positives and front viewed pictures. 3,964,193, Cl. 40-106.100.

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Delligatti, Patrick. Reciprocating self-contained marking device. 3,964,383, Cl. 101-44.000.

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Depouilly, Bernard Michel Henri; and Tournier, Christian Yves, to International Standard Electric Corporation. Scanning and distributing system for large centrally controlled switching exchanges. 3,965,303, Cl. 179-18.0FG.

Derail, Yves, to Chavanoz S.A. False twist spindle. 3,964,247, Cl. 57-77.450.

Derieg, Michael Edward; Earley, James Valentine; Fryer, Rodney Ian; and Sternbach, Leo Henryk, to Hoffmann-La Roche Inc. Intermediates for tricyclic benzodiazepines. 3,965,151, Cl. 260-490.000.

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Popov, Viktor Alexeevich; Kalashnik, Anatoly Nikolaevich; Chumachenko, Vasily Sergeevich; Gudkevich, Veniamin Mikhailovich; Panev, Georgy Alexeevich; Detochka, Vasily Ivanovich; Telesov, Savely Adolfovich; Pokrass, Leonid Moiseevich; Ofengenden, Abram Mikhailovich; Nesterovich, Raisa Petrovna; and Zhitnik, Georgy Gavrilovich, 3,964,900.

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Van Besauw, Jan Frans; De Volder, Noel Jozef; Van Engeland, Jozef Leonard; and Poot, Albert Lucien, 3,964,903.

de Vos, Hendrik A. J., to GTE Sylvania Incorporated. Ballast transformer mounting arrangement. 3,965,451, Cl. 336-67.000.

DeWitt, Robert; Jepson, Bernhart E.; and Schwind, Roger A., to United States of America, Energy Research and Development Administration. Separation of sulfur isotopes. 3,965,250, Cl. 423-539.000.

Diamond International Corporation: *See—*
Thomas, Leslie P., 3,964,233.

Diamond Shamrock Corporation: *See—*
Scozzie, James A., 3,965,139.

Dickens, Elmer D., Jr., to B. F. Goodrich Company, The. Smoke retardant vinyl chloride and vinylidene chloride polymer compositions. 3,965,068, Cl. 260-45.75N.

Dickenson, Harvard G. Four way diverter valve. 3,964,517, Cl. 137-625.430.

DiCola, Louis S.; Kemp, Donald W.; and Evans, H. Duane, to Raytheon Company. Organic carbon analyzer system. 3,964,868, Cl. 23-253.0PC.

Dictaphone Corporation: *See—*
Matz, Bjorn J.; and Rivers, Paul F., 3,965,484.

Diem, Hans: *See—*
Buschmann, Karl; Diem, Hans; Matthias, Guenther; and Wodtcke, Friedrich, 3,965,195.

Dierckx, Jozef Aime: *See—*
Janssens, Wilhelmus; Claeys, Daniel Alois; Lemahieu, Raymond Gerard; and Dierckx, Jozef Aime, 3,965,282.

Dieringer, Andrew M.; and Eidemanis, Gunars, to Rexnord Inc. Railroad tie handling machine and method. 3,964,397, Cl. 104-9.000.

Dieterich, Dieter: *See—*
Markusch, Peter; and Dieterich, Dieter, 3,965,051.

Diggs, Richard E. Heater and vapor generator. 3,964,465, Cl. 126-350.00B.

Dillard, John H.: *See—*
Marshall, Albert H.; Oharek, Frank J.; Dillard, John H.; and Entwistle, Robert J., 3,964,178.

Dimauro, Frank S. Dispenser for bodies in sealed sheet material compartments. 3,964,638, Cl. 221-3.000.

Dimitracopoulos, Panayotis C. Audiovisual book system. 3,964,188, Cl. 40-28.100.

Dimmer, Robert P., to GTE Automatic Electric Laboratories Incorporated. Electronic tone ringer. 3,965,307, Cl. 179-84.00T.

Dineen, John Joseph, to Moore Business Forms, Inc. Paper web trimming apparatus having feed band chopper. 3,964,356, Cl. 83-302.000.

Dinella, Donald; and Kovaric, Richard M., to Western Electric Company, Inc. Bonding contact members to circuit boards. 3,964,666, Cl. 228-106.000.

Dinelli, Dino; Morisi, Franco; and Zaccardelli, Delio, to Snam Progetti S.p.A. Process for the preparation of L-car-bamyl-amino acids and of the corresponding L-amino acids. 3,964,970, Cl. 195-2.000.

Dini, Mamiliano, to European Rotogravure Association. Method and apparatus for removing surplus ink on printing cylinders. 3,964,386, Cl. 101-169.000.

DiPeri, Leonard J. Energy conservation housing. 3,964,268, Cl. 62-121.000.

Ditzig, Albert F., to Molex Incorporated. Push button switch. 3,965,320, Cl. 200-314.000.

Dixon, Robert L. Light transmitter. 3,964,824, Cl. 350-190.000.

Dixon, Robert P., to General Electric Company. Compressor and expander circuits for compander system. 3,965,436, Cl. 330-29.000.

Dr. -Ing. H.c.F. Porsche Aktiengesellschaft: *See—*
Soffge, Friedhelm; and Albrecht, Gerhard, 3,964,119.

Dr. -Ing Rudolf Hell GmbH: *See—*
Baar, Walter; Koehler, Herbert; and Muecke, Walter, 3,964,382.

Dodson, Elmer E.: *See—*
May, Kenneth D.; Dodson, Elmer E.; and Cohee, Claude C., 3,964,590.

Dodson, James S., Jr.: *See—*
Petrides, Petros T.; Nickerson, Russell J.; Cordeiro, Rodney R.; and Dodson, James S., Jr., 3,965,329.

Doenges, Richard E.; and Amelung, James E., to TRW Inc. Investment wax. 3,964,915, Cl. 106-38.600.

Doin, Bernard J.: *See—*
Plantif, Bernard E.; Doin, Bernard J.; and Beaumont, Jean S., 3,964,256.

Dolan, Donald T.: *See—*
Costello, Matthew J.; Dolan, Donald T.; Dehaudringhien, Andre T.; Hurkmans, Antoon M.; Jasinski, Kenneth R.; and Keplinger, Edward G., 3,965,292.

Dolfini, Joseph Edward; Bohme, Ekkehard; and Slusarchyk, William A., to E. R. Squibb & Sons, Inc. 6-Arylthio penicillanic acid and derivatives thereof. 3,965,093, Cl. 260-239.100.

Domenz, Thomas B.: *See—*
Norbutas, Stanley R.; Domenz, Thomas B.; and Mieleszuk, Jan, 3,964,375.

Dorr-Oliver Incorporated: *See—*
Sheaffer, John A., 3,965,011.

Dorschner, Irvin E.: *See—*
Jenne', James F.; Dorschner, Irvin E.; Urch, Harvey M.; and Wenger, Jerry A., 3,964,402.

Dotter, Berton E., Jr., to TRW Inc. Test system for a T carrier type telephone PCM communications system. 3,965,309, Cl. 179-175.31R.

Dow Chemical Company, The: *See—*
Gibbs, Dale S.; Vandell, Robert D.; and Wessling, Ritchie A., 3,965,032.
Himmelstein, Kenneth J., 3,965,036.
Olstowski, Franciszek; and Parrish, Donald B., 3,965,073.

Dow Corning Corporation: *See—*
Elliott, Edward C., 3,965,065.

Drackett Company, The: *See—*
Murtaugh, Justin J., 3,965,048.

Drakoff, Raymond, to Lever Brothers Company. Lusterizing shampoo containing a polysiloxane and a hair-bodying agent. 3,964,500, Cl. 132-7.000.

Dressel, Otto: *See—*
Meusel, Otto; and Dressel, Otto, 3,965,379.

Dresser Industries, Inc.: *See—*
Englert, Robert D.; Berriman, Lester Porter; Armstrong, Kenneth P.; and Roe, Douglas A., 3,965,221.
Purton, Robert Merrill; and Maddock, Robert Brent, 3,964,516.

Dreyer, John E. Pallet devices and method. 3,964,618, Cl. 214-10.50R.

Driscoll, Gary L., to Sun Ventures, Inc. Method of manufacturing a foam fibrillated fibrous web from an isotactic polypropylene and polyethylene blend. 3,965,229, Cl. 264-50.000.

Drivas, Peter J.: *See—*
Shair, Frederick H.; Simmonds, Peter G.; Leighton, Robert B.; and Drivas, Peter J., 3,964,294.

Driver's Agency Ltd.: *See—*
Pittarelli, James A., 3,964,564.

Dufton, John P.: *See—*
Borbas, Robert A.; Dufton, John P.; Foster, James H.; and Siegel, Jeffrey W., 3,965,458.

Duggan, Thomas W.; and McNerney, Richard P., to Schlumberger Technology Corporation. Apparatus for repairing conductor insulation. 3,964,845, Cl. 425-13.000.

Duinker, Hans Dignus; Schoot, Cornelis Johannes; and Vermeulen, Gerardus Antonius Wilhelmus, to U.S. Philips Corporation. Method of making screens for cathode-ray tubes. 3,965,278, Cl. 427-54.000.

Duistermaat, Jan Hendrik; Gerritsen, Jan; and Panis, Constantius Johannes Waltherus, to U.S. Philips Corporation. Degaussing device for a color television display tube. 3,965,386, Cl. 315-8.000.

Dukes, Bobby Wayne, to N-S-W Corporation. Back-up wrench for threaded connectors. 3,964,352, Cl. 81-426.000.

Dumas, Odilon. Self-supporting pipe boom. 3,964,512, Cl. 137-615.000.

Dunkelman, Robert L., to Frymaster Corporation, The. Tilting frypan with drain system. 3,964,378, Cl. 99-425.000.

Dunlop Limited: *See—*
Harrington, Wilfred Henry, 3,964,532.
Smart, Thomas John, 3,965,286.

Dunnell, Alan Keith; Wade, Thomas Cyril James; and Greenwood, David, to Imperial Chemical Industries Limited. Crimping gears and process. 3,964,141, Cl. 28-1.800.

Dunwoodie, Duane E.: *See—*
Bauer, Paul R.; and Dunwoodie, Duane E., 3,965,418.

Du Pont de Nemours, E. I., and Company: *See—*
Everhart, William Duke; and McKay, Charles Raymond, 3,964,945.
Middleton, William J., 3,965,074.
Phillips, William Lewis, Jr.; and Uebler, Ernest Alan, 3,965,010.
Turnbull, John William, 3,965,236.

Dwyer, Allen Frederick: *See—*
Wickham, Geoffrey Gordon; and Dwyer, Allen Frederick, 3,964,473.

Dwyer, Thomas A., to Liquid Carbonic Corporation. Ice making machine. 3,964,270, Cl. 62-138.000.

Dyckerhoff & Widmann Aktiengesellschaft: *See—*
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Dynamit Nobel Aktiengesellschaft: *See—*
Budich, Wolfgang; Krah, Robert; and Theissen, Hans, 3,964,231.
Schultz, Neithart; Vahlensieck, Hans-Joachim; and Gebele, Rudolf, 3,965,038.

Dziala, Gabriela: *See—*
Klopotek, Alojzy; Profic, Jan; Uminski, Jerzy; and Dziala, Gabriela, 3,965,025.

Dzus Fastener Co., Inc.: *See—*
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E. E. Eljim Ecology Ltd.: *See—*
Bloch, Rene; Kedem, Ora; and Lobel, Ester, 3,965,255.

E. H. Sheldon and Company: *See—*
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E. R. Squibb & Sons, Inc.: *See—*
Denzel, Theodore; and Hoehn, Hans, 3,965,108.
Dolfini, Joseph Edward; Bohme, Ekkehard; and Slusarchyk, William A., 3,965,093.

Hauck, Frederic Peter; and Sundeen, Joseph E., 3,965,102.
Metzger, Julio, 3,965,090.
Yale, Harry L., 3,965,100.
Yale, Harry Louis; and Petigara, Ramesh B., 3,965,101.

Earl, T. Desmond, to Textron, Inc. Air cushion type undercarriage for aircraft. 3,964,698, Cl. 244-100.00A.

Earley, James Valentine: *See—*
Derieg, Michael Edward; Earley, James Valentine; Fryer, Rodney Ian; and Sternbach, Leo Henryk, 3,965,151.

Eastman Kodak Company: *See—*
Price, Harry J., 3,964,912.

Eastprint, Inc.: *See—*
Manley, Arthur G., 3,964,469.

Easy Heat-Wirekraft, MSP Industries Corporation: *See—*
Adams, Gerald E., 3,964,959.

Eaton, Sargent Sheffield, Jr., to RCA Corporation. CMOS oscillator. 3,965,442, Cl. 331-116.00R.

Ebeling, Wolfgang: *See—*
Banauch, Dieter; Brummer, Wolfgang; Ebeling, Wolfgang; Helger, Roland; Hennrich, Norbert; and Lang, Hermann, 3,964,974.

Eberle, Marcel K.; and Manning, Robert E., to Sandoz, Inc. 2-Amino-5-(trifluoromethyl phenylalkyl)-1,3,4-thiadiazoles. 3,965,110, Cl. 260-306.80D.

Eckert, Hans-Werner: *See—*
Koppensteiner, Gunter; Eckert, Hans-Werner; and Wehle, Volker, 3,965,265.

Eda, Masato, to Yamaha, Hatsudoki Kabushiki Kaisha. Rotary piston type engine. 3,964,448, Cl. 123-8.450.

Eder, Rupert: *See—*
Gutmann, Karl, Jr.; and Eder, Rupert, 3,964,401.

Eder, Ulrich; Haffer, Gregor; Ruppert, Jurgen; Sauer, Gerhard; and Wiechert, Rudolf, to Schering Aktiengesellschaft. 6,9-Oxido-9,10-secoestrane derivatives and method of synthesis. 3,965,124, Cl. 260-346.20M.

Edmonds, David L.: *See—*
Street, William M.; and Edmonds, David L., 3,964,109.

Edstrom, Andrew H., to Xerox Corporation. Ribbon guide for a serial printer. 3,964,595, Cl. 197-170.000.

Edwards, Edwin L. Roller replacing. 3,964,658, Cl. 226-190.000.

Edwards, James W., to Monsanto Company. Catalyzed process for imide-alcohol condensation. 3,965,075, Cl. 260-78.00L.

Edwards, John A.: *See—*
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Edwards, Robert S.: *See—*
Kuntschik, Lawrence F.; and Edwards, Robert S., 3,965,177.

Eftefield, Larry G.; and Wirt, Leon A., to Caterpillar Tractor Co. Self-aligning trunnion bearing assembly. 3,964,803, Cl. 308-72.000.

Eguchi, Tamiyuki; and Imai, Satoshi, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Membrane separation apparatus. 3,965,012, Cl. 210-433.00M.

Ehlscheid, Gunter; Langenbeck, Peter; and Stemmler, Kurt, to Winkler & Dunnebier Maschinenfabrik und Eisengiesserei KG. Method of cutting material to shape from a moving web by burning. 3,965,327, Cl. 219-121.0LM.

Ehret, Rudolf, to Pfaudler-Werke AG. Alternating voltage method of electrically detecting damage to an enamel layer having one or more tantalum plugs. 3,965,415, Cl. 324-54.000.

Eibel, Gyorgy: *See—*
Toth, Geza; Szabo, Gabor; Eibel, Gyorgy; and Somfai, Eva, 3,964,894.

Eiben, Frank J.; Halbert, Eric H.; Jobe, William T.; and Siegmann, Carl, to Senco Products, Inc. Safety firing control means for a fluid operated tool. 3,964,659, Cl. 227-8.000.

Eichenhofer, Kurt-Wilhelm; and Schliebs, Reinhard, to Bayer Aktiengesellschaft. Production of ketazines. 3,965,097, Cl. 260-240.00G.

Eidemanis, Gunars: *See—*
Dieringer, Andrew M.; and Eidemanis, Gunars, 3,964,397.

Eigenmann, Ludwig. Apparatus for applying tape marking material on road surfaces. 3,964,559, Cl. 180-1.0AP.

Eigenmann, Ludwig. Retro-reflecting element and method. 3,964,820, Cl. 350-104.000.

Eigenmann, Ludwig. Reflex reflecting system for road surface marking. 3,964,821, Cl. 350-105.000.

Eigenmann, Ludwig. Device for forming marking stripes on road surfaces. 3,964,835, Cl. 404-94.000.

Eisele, John A.: *See—*
Leinkram, Charles Z.; Oaks, William D.; Eisele, John A.; and Faraday, Bruce J., 3,964,155.

Eisenbach, Wilhelm; Lehmkuhl, Herbert; and Wilke, Gunther, to Studiengesellschaft Kohle m.b.H. Process for the electrochemical synthesis of organic metal compounds. 3,964,983, Cl. 204-59.00L.

Elastogran Maschinenbau GmbH & Co., Firma: *See—*
Ernst, Rudolf, 3,964,731.

Electrac, Inc.: *See—*
Honey, Raymond W.; and Katz, Louis, 3,965,341.

Electronic Engineering Company of California: *See—*
Yablonski, Robert E., 3,965,406.

Elford, Peter Ellice. Packaging machine. 3,964,239, Cl. 53-196.000.

Ellefson, Charles R.: *See—*
Cusic, John W.; Ellefson, Charles R.; and Woo, Chi Min, 3,965,104.

Elliott Brothers (London) Limited: *See—*
Cattermole, David Christopher, 3,964,511.

Elliott, Edward C., to Dow Corning Corporation. Method of improving the electrical properties of organopolysiloxane elastomers and compositions therefor. 3,965,065, Cl. 260-37.0SB.

Ellis, Franklin H.; and Andrews, Stephen W., to Sybron Corporation. Method of using electrodes having antiseptic properties for LIDC therapy. 3,964,477, Cl. 128-172.100.

Ellis, Michael C.: *See—*
Manning, Harold E.; and Ellis, Michael C., 3,965,044.

Eloranta, Vaito K., to Polaroid Corporation. Manually operated photographic processing system. 3,965,480, Cl. 354-83.000.

Elsner, Bertram F.; and Elsner, Frank, Jr., to Elsner Engineering Works, Inc. Seal temperature control means for curtain-type wrapping machine. 3,965,333, Cl. 219-243.000.

Elsner Engineering Works, Inc.: *See—*
Elsner, Bertram F.; and Elsner, Frank, Jr., 3,965,333.

Elsner, Frank, Jr.: *See—*
Elsner, Bertram F.; and Elsner, Frank, Jr., 3,965,333.

Elwyn, Richard A.: *See—*
Ring, Wallace H.; Adair, John C.; and Elwyn, Richard A., 3,964,488.

EMI Patents Limited: *See—*
Hounsfield, Godfrey Newbold, 3,965,357.

Emil Korsch Spezialfabrik fur Komprimiermaschinen: *See—*
Marfiewicz, Wilhelm, 3,964,852.

Emmons, Stephen Perry, to Texas Instruments Incorporated. Technique for reduction of electrical input noise in charge coupled devices. 3,965,368, Cl. 307-221.00D.

Energystics Corporation: *See—*
Schalow, Rudolph D.; and Link, John T., 3,964,677.

Engalitcheff, John, Jr.; and Schinner, Edward N., to Baltimore Aircoil Company, Inc. Gas scrubbing apparatus. 3,964,886, Cl. 55-228.000.

Engelhardt, John S., to Anaconda Company, The. Apparatus including novel bridge circuit. 3,964,315, Cl. 73-362.0AR.

Engelter, Elwyn E.: *See—*
Whitmore, Charles H.; Houtman, Paul K.; and Engelter, Elwyn E., 3,964,844.

Engins Matra: *See—*
Lardennois, Regis; Robert, Michel; Gabillard, Robert; and Rubin, Edouard, 3,964,702.

Engle, Robert C., to Ex-Cell-O Corporation. Stone wear indication on a honing machine. 3,964,211, Cl. 51-165.870.

Englert, Robert D.; Berriman, Lester Porter; Armstrong, Kenneth P.; and Roe, Douglas A., to Dresser Industries, Inc. Fluid flow device and liquid metering. 3,965,221, Cl. 261-23.00A.

English, Brian Box; and Cross, Frederick, to Ferranti, Limited. Beamed-intensity control systems for cathode-ray tubes. 3,965,389, Cl. 315-384.000.

Entwistle, Robert J.: *See—*
Marshall, Albert H.; Oharek, Frank J.; Dillard, John H.; and Entwistle, Robert J., 3,964,178.

Epstein, Jacob J., to Seymour Foods, Inc. Method of freezing cooked eggs. 3,965,270, Cl. 426-418.000.

Epstein, Jacob J.; and York, Lawrence R., to Seymour Foods, Inc. Method of freeze treating mayonnaise-containing products. 3,965,272, Cl. 426-524.000.

Eric, Lucien: *See—*
Chubb, Francis L.; and Eric, Lucien, 3,965,173.

Erikson, Kenneth R.: *See—*
Wreede, John E.; Stoddard, Terence C.; and Erikson, Kenneth R., 3,965,461.

Ernest, Robert P.; Jones, Charles M.; Ounsted, Edwin J.; and Wu, Hai, to Ford Motor Company. Water cooling system – Wankel engine. 3,964,445, Cl. 123-8.010.

Ernst, Rudolf, to Elastogran Maschinenbau GmbH & Co., Firma. Mixing apparatus for multi-component plastics, particularly polyurethane. 3,964,731, Cl. 259-4.00R.

Ernst Wirz AG, Kipper- & Maschinenfabrik: *See—*
Wirz, Herbert A., 3,964,625.

ESB Incorporated: *See—*
Oltman, John E.; and Feldhake, Ralph H., 3,964,932.

Eschler, Hans, to Siemens Aktiengesellschaft. Apparatus and process for deflecting the direction of light beams in a controllable fashion. 3,964,825, Cl. 350-161.000.

Eshelman, Philip V., to Colt Industries Operating Corporation. Ignition distributor. 3,964,456, Cl. 123-117.00R.

Esorco Corporation: *See—*
Speller, Frank N., Jr., 3,964,545.

Esquire, Inc.: *See—*
Thompson, Joseph L., Jr, 3,965,346.

Esser, Leonard Jan Maria, to U.S. Philips Corporation. Charge transfer device with J FET isolation and means to drain stray charge. 3,965,481, Cl. 357-24.000.

Etablissements Francois Salomon et Fils: *See—*
Salomon, Georges Pierre Joseph, 3,964,759.

Etablissements Bertrand Faure: *See—*
Labadie, Jean Francois; Bernard, Armand R.; de la Taille, Olivier P.; and Thary, Christian, 3,964,787.

Ethyl Corporation: *See—*
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Worrel, Calvin J., 3,965,182.

Ettinger, John A.: *See—*
Silvis, Richard R.; and Ettinger, John A., 3,964,615.

Euchner, Perry C., Jr. Appartus for limiting vacuum and pressure in a furnace. 3,964,675, Cl. 236-15.00C.

European Rotogravure Association: *See—*
Dini, Mamiliano, 3,964,386.

Evans, Anthony Charles: *See—*
Lopez, Eugene F.; and Evans, Anthony Charles, 3,965,215.

Evans, H. Duane: *See—*
DiCola, Louis S.; Kemp, Donald W.; and Evans, H. Duane, 3,964,868.
Evans, Ronald C.; and Corderman, Sidney A., to McIntosh Laboratory, Inc. Protective system for stereo loudspeakers. 3,965,295, Cl. 179-1.00A.
Evans, Ronald C.: *See—*
Fish, Lawrence W., Jr.; Evans, Ronald C.; and Corderman, Sidney A., 3,965,423.
Everhart, William Duke; and McKay, Charles Raymond, to Du Pont de Nemours, E. I., and Company. Method of making an electrical cable. 3,964,945, Cl. 156-52.000.
Everingham, John R.; and Hoenke, Karl A., to Chevron Research Company. Lawn moss control with ferric ammonium sulfate-ammonium sulfate double salts. 3,964,893, Cl. 71-65.000.
Evgen, Allan: *See—*
Lunzer, Leo M.; and Evgen, Allan, 3,964,561.
Evrard, Ernest L., to Societe Anonyme Machines Automatiques Cillotta. Bottle closing apparatus. 3,964,240, Cl. 53-306.000.
Ex-Cell-O Corporation: *See—*
Engle, Robert C., 3,964,211.
Exley, John T., to Avco Corporation. Eccentric passage pipe diffuser. 3,964,837, Cl. 415-181.000.
Extel Corporation: *See—*
Cless, Gerhard; and Kaplan, Edward L., 3,964,673.
Exxon Research and Engineering Company: *See—*
Baldwin, Francis P.; and Malatesta, Alberto, 3,965,213.
Burnop, Victor Charles Ernest; and Watkins, Ronald Charles, 3,965,017.
Fung, Shun Chong; and Tauster, Samuel J., 3,964,933.
Irani, Cyrus A.; and McHugh, Daniel J., 3,965,001.
Romano, Gaetano; and Gorietti, Bruno, 3,964,258.
F. L. Smidth & Co.: *See—*
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Fachbach, Heinz: *See—*
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Thien, Gerhard; and Fachbach, Heinz, 3,964,462.
Fair, James W.: *See—*
Young, Danny J., 3,965,395.
Falk, Eugene H. Process for mounting photographs to simulate an oil painting. 3,964,946, Cl. 156-59.000.
Falk, Robert A.: *See—*
Kleiner, Eduard K.; and Falk, Robert A., 3,965,148.
Fancher, Llewellyn W., to Stauffer Chemical Company. Thiocyano xanthates. 3,965,137, Cl. 260-454.000.
Faraday, Bruce J.: *See—*
Leinkram, Charles Z.; Oaks, William D.; Eisele, John A.; and Faraday, Bruce J., 3,964,155.
Farley, David L.; and Barrington, Burchus Q., to Halliburton Company. Pressure operated isolation valve for use in a well testing and treating apparatus, and its method of operation. 3,964,544, Cl. 166-315.000.
FAS/CON Systems, Inc.: *See—*
Manchester, Isaac F., Jr., 3,964,250.
Faure, Jean-Pierre; and Michot, Gilbert, to Commissariat a l'Energie Atomique. Device for locating and/or obturating leaky tubes in heat-exchangers. 3,964,293, Cl. 73-40.50A.
Federal Paper Board Company, Inc.: *See—*
Steel, Thomas C., 3,964,671.
Feist, Wolfgang M.: *See—*
Picker, Amos; and Feist, Wolfgang M., 3,965,385.
Fekete, Thomas M.: *See—*
Ager, John W.; and Fekete, Thomas M., 3,965,219.
Feldhake, Ralph H.: *See—*
Oltman, John E.; and Feldhake, Ralph H., 3,964,932.
Feldwick, Raymond Douglas; and Hildebrandt, Darrell Edward, to W. R. Grace & Co. Formation of alumina-containing particles with aluminum hydroxide binder. 3,965,042, Cl. 252-455.00R.
Fenn, John B., Jr.: *See—*
Allan, Frank V.; Fenn, John B., Jr.; and Lewis, John H., 3,965,352.
Fenton, Russell R. Cover assembly for open top truck bodies. 3,964,781, Cl. 296-100.000.
Ferranti, Limited: *See—*
English, Brian Box; and Cross, Frederick, 3,965,389.
Ferraris, Giuseppe: *See—*
Priola, Aldo; Cesca, Sebastiano; and Ferraris, Giuseppe, 3,965,078.
Ferraro, Frank A., to Warner-Lambert Company. Adjustable safety razor. 3,964,159, Cl. 30-47.000.
Ferris, Ray L.; and Marulic, Walter J., to Pullman Incorporated. Fifth wheel plate assembly. 3,964,766, Cl. 280-433.000.
Ferro Corporation: *See—*
Schumacher, Ray F.; Prasek, David J.; and Van Stone, Howard L., 3,964,892.
Fetzer, Helmut; Braun, Hans; Cieslok, Gunter; and Rasenberger, Otto, to L. Schuler GmbH. Drive mechanism for a reciprocating feed. 3,964,357, Cl. 83-318.000.
Fiat Societa per Azioni: *See—*
Husse, Massimo; and Lagonigro, Mauro, 3,964,309.
Fiber Industries, Inc.: *See—*
Owens, Malcolm P.; Barnes, Edgar E.; and Burton, Dennis Ray, 3,964,721.
Firester, Arthur H., to United States of America, Army. Electrooptic-Q-switching system for a laser. 3,965,439, Cl. 331-94.50Q.
Firmenich S.A.: *See—*
Schulte-Elte, Karl-Heinrich; Joyeux, Michel; and Ohloff, Gunther, 3,965,189.
Fischer, Artur. Expansion anchor for suspended ceilings and other suspended elements. 3,964,229, Cl. 52-698.000.
Fischer, Artur. Expansion anchor device. 3,964,230, Cl. 52-698.000.
Fischer, Christopher L.: *See—*
Stivers, Edward C.; and Fischer, Christopher L., 3,964,274.
Fischer, Roman: *See—*
Goetz, Norbert; and Fischer, Roman, 3,965,193.
Fish, Lawrence W., Jr.; Evans, Ronald C.; and Corderman, Sidney A., to McIntosh Laboratory Inc. Automatic frequency control system. 3,965,423, Cl. 325-346.000.
Fishburn, Robert Anthony: *See—*
Jones, Evan Thomas Richard; and Fishburn, Robert Anthony, 3,964,899.
Fisher, Don E.; Knauff, Paul A.; and Bowen, David, Jr., to Monsanto Company. Traverse winding method. 3,964,724, Cl. 242-43.00R.
Fisher, John Albert, to Weathershields Limited. Opening roof assemblies for vehicles. 3,964,783, Cl. 296-137.00C.
Fitzgerald, John B., to ACF Industries, Incorporated. Multi condition relief valve. 3,964,259, Cl. 60-290.000.
Flaschar, Heinz: *See—*
Hesse, Horst; Kobald, Walter; Gand, Heinz; Hoheisel, Rainer; Sopha, Klaus; Flaschar, Heinz; Kleinschmidt, Heinz; Arnold, Winfried; and Zeuch, Werner, 3,964,518.
Fledges, Werner; and van Hullen, Peter, to Becker & van Hullen Niederrheinische Maschinenfabrik. Apparatus for loading multi-stage heating presses. 3,964,853, Cl. 425-338.000.
Fleshman, Roger L. Non-climbable poultry cage front. 3,964,439, Cl. 119-17.000.
Flider, Frank S., to Justrite Manufacturing Company. Self closing safety gate valve for viscous fluids. 3,964,728, Cl. 251-183.000.
Flier, Ronald J.: *See—*
Coppage, Thomas B.; Flier, Ronald J.; and Payne, Bernard M., 3,965,259.
FMC Corporation: *See—*
Ager, John W.; and Fekete, Thomas M., 3,965,219.
Benson, William Merle, 3,964,779.
Vensel, Perry M., 3,964,600.
Fogle, Stephen Fuller, to Texas Dynamatics, Inc. Fluid actuated downhole drilling device. 3,964,558, Cl. 175-107.000.
Food Engineering Corporation: *See—*
Burgess, Ralph D., Jr., 3,964,715.
Foote, Kenneth R.; Hanzel, Joseph W.; and Froehner, Warren P., to United States of America, Navy. Igniter. 3,964,393, Cl. 102-37.600.
Ford Motor Company: *See—*
Barrett, Ronald Derek; and Howard, Michael Roi, 3,964,586.
Ernest, Robert P.; Jones, Charles M.; Ounsted, Edwin J.; and Wu, Hai, 3,964,445.
Freismuth, Richard J., 3,965,224.
Mahoney, Lee R., 3,965,149.
Rabinowitz, Stephen, 3,964,534.
Telang, Yeshwant P., 3,964,145.
Fordsmand, Marc, to Kicon AG. Fixture for the mounting and cooling of fluorescent tubes. 3,965,345, Cl. 240-47.000.
Forker, Ray B., Jr.; and Panzarino, Joseph N., to Corning Glass Works. Method and apparatus for providing uniform surface browning of foodstuff through microwave energy. 3,965,323, Cl. 219-10.55E.
Forman, Clarence Albert: *See—*
Boggs, Beryl Aaron; Carr, Robert David; Cary, Lawrence Edward; Forman, Clarence Albert; Murray, Wayne Henry; Peterson, Weldon Herbert; and Montgomery, Everett Gray, 3,964,722.
Foseco International Limited: *See—*
Jones, Evan Thomas Richard; and Fishburn, Robert Anthony, 3,964,899.
Foster, James H.: *See—*
Borbas, Robert A.; Dufton, John P.; Foster, James H.; and Siegel, Jeffrey W., 3,965,458.
Foster, Richard D.: *See—*
Ott, Norman D.; and Foster, Richard D., 3,964,726.
Fowler, James E., to Deering Milliken Research Corporation. Carpet tile machine. 3,964,353, Cl. 83-1.000.
Fox, Dale H. Combined boot jack and shaper. 3,964,117, Cl. 12-120.500.
Fox, J. DeWitt. Universal cervical collar. 3,964,474, Cl. 128-87.00B.
Fox Specialty Co., Inc.: *See—*
McCabe, John H., 3,964,629.
Foxboro/Trans-Sonics, Inc.: *See—*
Blanchard, Robert L., 3,964,317.
Francis, Marion David: *See—*
Tofe, Andrew John; and Francis, Marion David, 3,965,254.
Frank, Earl E., to Abex Corporation. Railroad guard rails. 3,964,679, Cl. 238-17.000.
Frank, Gomer S., to Aquality, Inc. Visual color comparator with integral dual dip cells. 3,964,831, Cl. 356-182.000.
Franklin, Frederick C., to Chevron Research Company. Maleic anhydride recovery. 3,965,123, Cl. 260-346.80M.
Franklin, Wesley D. Apparatus for obtaining earth cores. 3,964,555, Cl. 175-44.000.
Frant, Martin: *See—*
Riseman, John H.; and Frant, Martin, 3,964,988.
Fredericks, George: *See—*
List, Helmut; and Fredericks, George, 3,965,383.
Freenor, Francis J., to Chevron Research Company. Phosphoroamidothioates. 3,965,218, Cl. 260-941.000.

Freeport Minerals Company: *See—*
Wiewiorowski, Tadeusz K.; and Nutt, Michael O., 3,965,248.

Freismuth, Richard J., to Ford Motor Company. Carburetor choke valve positioner. 3,965,224, Cl. 261-39.00B.

Frick, Hans-Dieter: *See—*
Sieber, Werner; Ganser, Friedrich; Hammer, Thomas; Viehrig, Wolfgang; Frick, Hans-Dieter; and Osegowitsch, Viktor, 3,964,191.

Fried, John H.: *See—*
Beard, Colin C.; Edwards, John A.; and Fried, John H., 3,965,113.
Pfister, Jurg R.; Harrison, Ian T.; and Fried, John H., 3,965,115.

Friedman, Jay, to Tylan Corporation. Dielectric-constant measuring apparatus. 3,965,416, Cl. 324-58.50B.

Froehner, Warren P.: *See—*
Foote, Kenneth R.; Hanzel, Joseph W.; and Froehner, Warren P., 3,964,393.

Froning, Edward C. Apparatus for sterotaxic lateral extradural disc puncture. 3,964,480, Cl. 128-215.000.

Fryer, Richard M.; and Matlock, Robert G., to United States of America, Energy Research and Development Administration. Identification of failed fuel element. 3,964,964, Cl. 176-19.0LD.

Fryer, Rodney Ian: *See—*
Derieg, Michael Edward; Earley, James Valentine; Fryer, Rodney Ian; and Sternbach, Leo Henryk, 3,965,151.

Frymaster Corporation, The: *See—*
Dunkelman, Robert L., 3,964,378.

Fuchs, Francis Joseph, Jr., to Western Electric Company, Inc. Production of multiple elongated products such as wire. 3,964,283, Cl. 72-42.000.

Fuga, Nobuhiko: *See—*
Watanabe, Yoshihisa; Imanari, Makoto; Nojiri, Naohiro; Fuga, Nobuhiko; and Nakajima, Masato, 3,965,162.

Fuji Photo Film Co., Ltd.: *See—*
Hirose, Takeshi; Oishi, Yasushi; and Sakai, Tadao, 3,964,905.
Matsukawa, Hiroharu; and Saeki, Keiso, 3,965,033.

Fuji Toyuki Kabushiki Kaisha: *See—*
Sakasegawa, Koji; Ohsumi, Atsushi; Saito, Tatsue; Hosaka, Yukio; Kunioka, Kazuo; Yamamoto, Tomio; and Asai, Tadashi, 3,965,360.

Fujii, Yoshikazu: *See—*
Hirooka, Masaaki; Fujii, Yoshikazu; Morita, Shigeru; Namazue, Isamu; and Hata, Kazuhiko, 3,964,955.

Fujio, Takashi: *See—*
Shimogawa, Sachio; Fujio, Takashi; Arika, Mikio; Yamada, Nobuo; Kodama, Takashi; and Nakata, Tetsuya, 3,965,050.

Fujisawa Pharmaceutical Co., Ltd.: *See—*
Umio, Suminori; Maeno, Shizuo; Ueda, Ikuo; Sato, Yoshinari; and Matsuo, Masaaki, 3,965,122.

Fujita, Hiroshi: *See—*
Ichii, Takeshi; and Fujita, Hiroshi, 3,965,165.

Fujita, Mitsuo: *See—*
Katoh, Hiroshi; and Fujita, Mitsuo, 3,965,483.

Fujitsu Ltd.: *See—*
Ikeda, Hiroyuki; and Inagaki, Takefumi, 3,964,830.

Fukatsu, Shunzo: *See—*
Umezawa, Hamao; Maeda, Kenji; Kondo, Shinichi; and Fukatsu, Shunzo, 3,965,089.

Fukuda, Heijiro. Mold apparatus for continuously producing laminated resinoid material. 3,964,849, Cl. 425-224.000.

Fukumoto, Hisashi: *See—*
Kawamura, Eiji; Nishimura, Yoshitaka; and Fukumoto, Hisashi, 3,964,562.

Fuld, Kenneth, to Kestenman Bros. Mfg. Co.; and Major Watch Case Co., Inc., part interest to each. Watch band and connector therefor. 3,964,652, Cl. 224-4.00E.

Fulop, Janos: *See—*
Johan, Bela; Szemler, Laszlo; Fulop, Janos; Szontagh, Tamas; Simonovits nee Czink, Emilia; Bekes nee Erdos, Judit; Kuti, Laszlo; Toros, Robert; Szekely, Denes; Szabo, Laszlo; Seitz, Karoly; Vajda, Tade; Kovacs nee Komoroczy, Erzsebet; Hargital nee Franyo, Aniko; and Polinszky, Karoly, 3,964,971.

Funahashi, Isao: *See—*
Morita, Tomijiro; Funahashi, Isao; Sugai, Masayoshi; Sasakawa, Atushi; and Takaiwa, Masakazu, 3,965,242.

Fung, Shun Chong; and Tauster, Samuel J., to Exxon Research and Engineering Company. Carbon article including electrodes and methods of making the same. 3,964,933, Cl. 136-121.000.

Furber, Robert Arthur: *See—*
Swinkels, Godefridus Maria; Furber, Robert Arthur; Milner, Edward Francis Godfrey; Genik-Sas-Berezowsky, Roman Michael; and Kirby, Charles Ray, 3,964,901.

Furst, Andor; Muller, Marcel; Alig, Leo; Keller, Peter; Kerb, Ulrich; and Wiechert, Rudolf, to Hoffmann-La Roche Inc. 6β,7β-Epoxy-1α,2α-methylen-D-homo-4-pregnen-3,20-diones. 3,965,128, Cl. 260-348.00C.

Furukawa Electric Co., Ltd., The: *See—*
Nojiri, Akio; Shiina, Naonori; Nakae, Hiroyuki; Ueno, Hideyo; and Namiki, Isamu, 3,965,054.

Furuya, Yoshiaki: *See—*
Nishi, Atsuyoshi; Kawabuchi, Isamu; Yashiro, Katuo; Ono, Kenichi; and Furuya, Yoshiaki, 3,964,859.

Fusco, Vito A.; Carlsen, Ove Christian; and Wright, Steven F., to Molex Incorporated. Connector assembly machine. 3,964,147, Cl. 29-203.00B.

G. D. Searle & Co.: *See—*
Collins, Paul W.; and Pappo, Raphael, 3,965,143.
Cusic, John W.; Ellefson, Charles R.; and Woo, Chi Min, 3,965,104.

G & R Industries, Inc.: *See—*
Roller, William G., 3,964,510.

G. Siempelkamp & Co.: *See—*
Bongers, Hendrikus-Johannes, 3,964,851.

G. Tsutomu Arai and Roger A. Hummel, Architects, (a Partnership): *See—*
Hummel, Roger A., 3,964,216.

Gabbrielli, Luigi; and Giovanetti, Piero, to Ing. C. Olivetti & C., S.p.A. Keyboard of elastic material for office machines. 3,964,594, Cl. 197-98.000.

Gabillard, Robert: *See—*
Lardennois, Regis; Robert, Michel; Gabillard, Robert; and Rubin, Edouard, 3,964,702.

Gainer, John L., to University of Virginia. Method for treating papillomas. 3,965,261, Cl. 424-180.000.

Galen, Ralph W.; and Vanderpoel, John A. Bicycle rack. 3,964,611, Cl. 211-5.000.

Galland, Robert J.: *See—*
Stefano, Rocco L.; and Galland, Robert J., 3,964,358.

Gallez, Francis: *See—*
Mercier, Jean; Gallez, Francis; and Legras, Roger, 3,965,064.

Gambini, Arnaldo; and Terenziani, Demetrio, to Snam Progetti S.p.A. Device for steplessly detecting the ovalizations and the projections on two orthogonal planes of the curved geometrical configuration of a submerged pipeline. 3,964,171, Cl. 33-178.00E.

Gambino, Richard J.: *See—*
Chaudhari, Praveen; Cuomo, Jerome J.; and Gambino, Richard J., 3,965,463.

Gand, Heinz: *See—*
Hesse, Horst; Kobald, Walter; Gand, Heinz; Hoheisel, Rainer; Sopha, Klaus; Flaschar, Heinz; Kleinschmidt, Heinz; Arnold, Winfried; and Zeuch, Werner, 3,964,518.

Gane, Gordon R., to Kaiser Aluminum & Chemical Corporation. Easy open end method and apparatus. 3,964,414, Cl. 113-121.00C.

Gannett, Danforth K., to Bell Telephone Laboratories, Incorporated. Secret communication signal generating system. 3,965,297, Cl. 179-1.50R.

Gannon, Peter F. Adjustable safety ladder for above-the-ground swimming pools. 3,964,572, Cl. 182-86.000.

Ganser, Friedrich: *See—*
Sieber, Werner; Ganser, Friedrich; Hammer, Thomas; Viehrig, Wolfgang; Frick, Hans-Dieter; and Osegowitsch, Viktor, 3,964,191.

Garber, Daniel C., to Sun Shipbuilding & Drydock Company. Removal of contaminants from water. 3,965,004, Cl. 210-73.00W.

Garcia, Valentine, to Xerox Corporation. Self-aligning and self-leveling pinch roll for magnetic card transport system. 3,964,739, Cl. 271-3.000.

Gardner, James W. Machine for slitting nut skins. 3,964,379, Cl. 99-541.000.

Garman, Anthony L.: *See—*
Shankwitz, Robert F.; and Garman, Anthony L., 3,964,152.

Garwood, William E.; Manzoni, John A.; Whyte, Thaddeus F., Jr.; and Wise, John J., to Mobil Oil Corporation. Conversion of low octane hydrocarbons to high octane gasoline. 3,965,205, Cl. 260-668.00R.

Gassett, Paul L.; and McLeod, Wilfred R., to Gulf Research & Development Company. Offshore terminal. 3,964,423, Cl. 114-230.000.

Gassner, Hans; and Kress, Manfred, to Kugelfischer Georg Schafer & Co. Friction rollers for twist tubes in false-twisting apparatus. 3,964,324, Cl. 74-215.000.

Gaston County Dyeing Machine Company: *See—*
Clifford, Graham Frank; and Spurrier, Mack W., 3,964,153.

Gates Rubber Company, The: *See—*
Bliss, Robert H., 3,964,846.
Ching, Larry K. W., Jr.; and Coleman, Charles E., 3,964,934.
Redmond, John D., Jr., 3,964,328.

Gauchard, Fernand. Coffin. 3,964,140, Cl. 27-2.000.

Gavronsky, Boris Viktorovich: *See—*
Krupman, Leonid Isaakovich; Okonishnikov, Ary Mikhailovich; Sochnev, Alexandr Egorovich; Gavronsky, Boris Viktorovich; Popov, Viktor Alexeevich; Kalashnik, Anatoly Nikolaevich; Chumachenko, Vasily Sergeevich; Gudkevich, Veniamin Mikhailovich; Panev, Georgy Alexeevich; Detochka, Vasily Ivanovich; Telesov, Savely Adolfovich; Pokrass, Leonid Moiseevich; Ofengenden, Abram Mikhailovich; Nesterovich, Raisa Petrovna; and Zhitnik, Georgy Gavrilovich, 3,964,900.

Gay, Walter A.; and Tobin, John H., to Olin Corporation. Preparation of p-fluoro-m-phenylenediamine. 3,965,183, Cl. 260-578.000.

Gaylord, Jack A. Locking means for releasable strap connectors. 3,964,138, Cl. 24-230.00A.

Gearhart, Marvin; King, David W.; Mendoza, Rudolph R.; Scherbatskoy, Serge A.; and Young, James D., to Gearhart-Owen Industries, Inc. Downhole signaling system. 3,964,556, Cl. 175-45.000.

Gearhart-Owen Industries, Inc.: *See—*
Gearhart, Marvin; King, David W.; Mendoza, Rudolph R.; Scherbatskoy, Serge A.; and Young, James D., 3,964,556.

Gebele, Rudolf: *See—*
Schultz, Neithart; Vahlensieck, Hans-Joachim; and Gebele, Rudolf, 3,965,038.

Gebruder Junghans GmbH: *See—*
Kaiser, Hans; and Kopf, Arthur, 3,964,395.

Gebrueder Buehler AG: *See—*
Koch, Peter; and Beyer, Eduard, 3,964,537.

Geist, Robert; and Rudolph, Franz Benedikt, to Lever Brothers Company. Printing of deep drawn containers with images reflected from inside of cylinder. 3,964,910, Cl. 96-46.000.

Gelbuda, William A.: *See*—
Mueller, Floyd F.; and Gelbuda, William A., 3,964,404.

Geleijnse, Johannes; and Geleijnse, Machiel, to M. Gelcijnse & Zoon, Firma. Wooden spiral staircase. 3,964,222, Cl. 52-187.000.

Geleijnse, Machiel: *See*—
Geleijnse, Johannes; and Geleijnse, Machiel, 3,964,222.

General Dynamics Corporation: *See*—
Snyder, H. Ben, 3,964,956.

General Electric Company: *See*—
Arnold, Richard B.; and Smith, Dallas F., 3,964,525.
Bessen, Irwin I.; Betts, Robert K.; and Hillery, Robert V., 3,964,877.
Dixon, Robert P., 3,965,436.
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McCrosky, Warren N.; and Peterschmidt, Dennis F., 3,965,382.
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General Foods Corporation: *See*—
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Stocker, Charles T.; Schara, Robert E.; Marshall, William E.; Hayes, John T., Jr.; and Glicksman, Martin, 3,965,268.

General Foods Limited: *See*—
Lee, William F.; Jeffery, William J.; Pyves, Richard R.; and Isaac, Moshi Y., 3,965,269.

General Motors Corporation: *See*—
Beam, Paul E., Jr.; and Meyers, Charles K., 3,964,342.
Bremer, Richard J., 3,964,796.
Brown, Donald R., 3,964,455.
Campbell, Lewis B.; Huffman, Robert E.; and Jones, Robert L., 3,964,578.
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Mathues, Thomas P., 3,964,795.
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General Signal Corporation: *See*—
Smith, William E.; and Bowden, Charles J., 3,964,566.

General Tire & Rubber Company, The: *See*—
Boles, Hubert J., 3,964,950.
Hargis, Ivan Glen; and Livigni, Russell Anthony, 3,965,080.

Genik-Sas-Berezowsky, Roman Michael: *See*—
Swinkels, Godefridus Maria; Furber, Robert Arthur; Milner, Edward Francis Godfrey; Genik-Sas-Berezowsky, Roman Michael; and Kirby, Charles Ray, 3,964,901.

Gentile, Luigi: *See*—
Hutter, Charles G., Jr.; and Gentile, Luigi, 3,964,106.

Georg Fischer Aktiengesellschaft: *See*—
Kopp, Hans, 3,964,144.

Gerard, Pierre Y. Disengageable reduction gear unit. 3,964,335, Cl. 74-425.000.

Gerhart, R. John: *See*—
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Smith, William E.; and Gerhart, R. John, 3,965,155.
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Gernlein, Hermann: *See*—
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Gerritsen, Jan: *See*—
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Gerson, Ronald L.; and Caprio, Lawrence A., to Louis M. Gerson Co., Inc. Blade scraper. 3,964,162, Cl. 30-162.000.

Gerstel, Martin S.; and Place, Virgil A., to Alza Corporation. Drug delivery device. 3,964,482, Cl. 128-260.000.

Getz, Donald J. Garbage can for use with disposable bags. 3,964,630, Cl. 220-63.00R.

Gibbs, Dale S.; Vandell, Robert D.; and Wessling, Ritchie A., to Dow Chemical Company, The. Colloidally stable dispersions. 3,965,032, Cl. 252-306.000.

Gideon, Thomas R. Knot simulator. 3,964,105, Cl. 2-152.00R.

Giertz, Hubert: *See*—
Amann, August; Bolz, Gerhard; Wiersdorff, Walter-Wielant; Giertz, Hubert; and Wilsmann, Klaus, 3,965,119.

Gimple, James J., to Champion Spark Plug Company. Electrostatic spray apparatus. 3,964,683, Cl. 239-15.000.

Giordano, Annie Sue; Burke, Richard Lerda; and Wixon, Harold Eugene, to Colgate-Palmolive Company. Anionic fabric conditioners. 3,965,014, Cl. 252-8.700.

Giovanetti, Piero: *See*—
Gabbrielli, Luigi; and Giovanetti, Piero, 3,964,594.

Giovanni, Zago, to Bassani S.p.A. Frame for the mounting of interchangeable electrical units. 3,964,705, Cl. 248-27.00R.

Giovannoni, Claude: *See*—
Cambon, Aime; Giovannoni, Claude; Pastor, Raphael; and Riess, Jean, 3,965,092.

Gipstein, Edward: *See*—
Bargon, Joachim; Gipstein, Edward; and Hiraoka, Hiroyuki, 3,964,908.

Girard, Jacques J.: *See*—
Paramythioti, Michel; De La Sayette, Emmanuel R.; and Girard, Jacques J., 3,964,834.

Girling Limited: *See*—
Habgood, Gordon Alfred, 3,964,581.
Harrison, Anthony William, 3,964,579.
Harrison, Anthony William, 3,964,806.

Giudicelli, Don Pierre Rene Lucien; and Najer, Henry, to Synthelabo. Phenyl propanones. 3,965,190, Cl. 260-592.000.

Giuffrida, Anthony J., to Ionics, Incorporated. Electrodialysis apparatus and process for ion modification. 3,964,985, Cl. 204-180.00P.

Givaudan Corporation: *See*—
Bertele, Erhard; and Schudel, Peter, 3,965,198.

Gladwin, Floyd R. Adjustable width continuous casting mold. 3,964,727, Cl. 249-158.000.

Glamorise Foundations, Inc.: *See*—
Martini, George, 3,964,491.

Gleason Works, The: *See*—
Hunkeler, Ernst J., 3,964,369.

Glicksman, Martin: *See*—
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Globol-Werk GmbH: *See*—
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Gloria, Hermilo R.: *See*—
Reinisch, Ronald F.; Gloria, Hermilo R.; Goldsberry, Ronald E.; and Adamson, Michael J., 3,965,096.

Gluckin, Gerald: *See*—
Boser, Ronald J.; and Gluckin, Gerald, 3,964,410.

Go International, Inc.: *See*—
Basham, Edward R.; and Smith, William D., 3,964,553.

Goetz, Norbert; and Fischer, Roman, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Production of high molecular weight $\alpha,\beta$-unsaturated aldehydes. 3,965,193, Cl. 260-598.000.

Gold, Elijah H., to Schering Corporation. Poultry coccidiosis treating compositions and method of using the same. 3,965,175, Cl. 260-562.00R.

Gold, Elijah H., to Schering Corporation. Novel substituted amidines. 3,965,176, Cl. 260-564.0RF.

Gold, Heinrich: *See*—
Claussen, Uwe; Gold, Heinrich; and Schroeder, Josef, 3,965,094.

Goldsberry, Ronald E.: *See*—
Reinisch, Ronald F.; Gloria, Hermilo R.; Goldsberry, Ronald E.; and Adamson, Michael J., 3,965,096.

Gololobov, Alexandr Dmitrievich: *See*—
Tarasova, Nina Vasilievna; Obolnikova, Elena Abramovna; Gololobov, Alexandr Dmitrievich; Samokhvalov, Gleb Ivanovich; Chepigo, Sergei Vladimirovich; Ivanova, Galina Ivanovna; Imshenetsky, Vladimir Vasilievich; and Kulikova, Vera Mikhailovna, 3,965,130.

Goltermann, Wandel U.: *See*—
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Goodman, Walter P.: *See*—
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Gora, Bernhard N.: *See*—
Kremer, Paul A.; and Gora, Bernhard N., 3,964,951.

Gordon, Frank John, to Motorola, Inc. Adaptable tuner assembly. 3,964,320, Cl. 74-10.800.

Gordon, Garron. Safety razor with an angularly adjustable head. 3,964,160, Cl. 30-89.000.

Gordon, James Sneddon; and den Brinker, Carl Siegmund, to Texas Instruments Incorporated. Vehicle monitoring system. 3,964,302, Cl. 73-117.300.

Gordon, Paul, to Strategic Medical Research Corporation. Method of enhancing learning and/or memory in warm blooded animals. 3,965,262, Cl. 424-180.000.

Gorietti, Bruno: *See*—
Romano, Gaetano; and Gorietti, Bruno, 3,964,258.

Gorog, Sandor: *See*—
Toth, Edit; Torley, Jozsef; Gorog, Sandor; Szporny, Laszlo; Palosi, Eva; and Szeberenyi, Szabolcz, 3,965,179.

Gostling, Peter Eric, to C. Evans & Sons Limited. Builders scaffolding. 3,964,575, Cl. 182-230.000.

Goto, Kenji, to Toyota Jidosha Kogyo Kabushiki Kaisha. Internal combustion engine with a supercharger. 3,964,451, Cl. 123-75.00B.

Gould Inc.: *See*—
Arndt, John P., 3,965,376.

Gourlandt, Albert Joseph; Gourlandt, Georges Charles; Cauquelin, Yves Bernard; and Lafon, Jean Francois. Automatic injection device. 3,964,481, Cl. 128-218.00A.

Gourlandt, Georges Charles: *See*—
Gourlandt, Albert Joseph; Gourlandt, Georges Charles; Cauquelin, Yves Bernard; and Lafon, Jean Francois, 3,964,481.

Graham Magnetics Incorporated: *See*—
Deffeyes, Robert J., 3,965,046.

Graham, Scott Oliver: *See—*
Himics, Richard Joseph; Graham, Scott Oliver; and Ross, Daniel Louis, 3,964,909.

Grancio, Michael R.; and Walker, George E., to Monsanto Company. Process of manufacturing lacquered articles of cold rolled abs resin. 3,965,230, Cl. 264-129.000.

Grant, Arthur F.: *See—*
Williams, Thomas O.; and Grant, Arthur F., 3,964,260.

Graphic Sciences, Inc.: *See—*
Costello, Matthew J.; Dolan, Donald T.; Dehaudringhien, Andre T.; Hurkmans, Antoon M.; Jasinski, Kenneth R.; and Keplinger, Edward G., 3,965,292.

Gratzmuller, Jean Louis. Apparatus for indicating cylinder fluid level. 3,965,317, Cl. 200-82.00E.

Graves, Ross E., to Hughes Aircraft Company. Tunable laser oscillator. 3,965,440, Cl. 331-94.50C.

Green, David Bruce: *See—*
Asselman, George Albert Apolonia; Green, David Bruce; Castelijns, Adrianus Petrus Johannes; Naastepad, Pieter Aart; and De Ruiter, Jacob Willem, 3,965,334.

Greenfield, Harold: *See—*
Malz, Russell E., Jr.; Amidon, Roger W.; and Greenfield, Harold, 3,965,174.

Greenwood, David: *See—*
Dunnell, Alan Keith; Wade, Thomas Cyril James; and Greenwood, David, 3,964,141.

Greier, Josef: *See—*
Thien, Gerhard; Fachbach, Heinz; and Greier, Josef, 3,964,449.

Gretag Aktiengesellschaft: *See—*
Degenhardt, Gunter; and Celio, Tino, 3,964,193.

Grevstad, Paul E., to United Technologies Corporation. Fuel cell cooling system with shunt current protection. 3,964,929, Cl. 136-86.00R.

Griffis, Juniper, to Lyst, Harold E., a part interest. Laterally tiltable truck or trailer dump body with hinged side panels and hydraulically operated means for opening either side panel and at different elevations of the dump body. 3,964,791, Cl. 298-11.000.

Grimes, Donald D.; Hahn, Roger M.; and Sheldon, Jerome F., to Rexnord Inc. Wear strip. 3,964,800, Cl. 308-3.00R.

Groeneveld, Johannes. Device for finishing tile joints. 3,964,854, Cl. 425-458.000.

Grohmann, Lothar, to International Standard Electric Corporation. Radio or television receiver with an automatic station finding arrangement. 3,965,336, Cl. 235-92.0FQ.

Groswith, Charles T., III: *See—*
Abildgaard, William H.; and Groswith, Charles T., III, 3,964,770.

Grundman, Richard G., to General Motors Corporation. Pressure control system. 3,964,506, Cl. 137-85.000.

Grushkin, Bernard; and Salzman, Michael N., to Xerox Corporation. One-step synthesis of aromatic organic diselenides. 3,965,049, Cl. 260-2.00M.

GTE Automatic Electric (Canada) Limited: *See—*
Borbas, Robert A.; Dufton, John P.; Foster, James H.; and Siegel, Jeffrey W., 3,965,458.

GTE Automatic Electric Laboratories Incorporated: *See—*
Dimmer, Robert P., 3,965,307.
Marheine, Edward A., 3,965,304.
Ng, John; and Jacobs, Melvin A., 3,965,305.
Thomas, Robert M., 3,965,447.

GTE Laboratories Incorporated: *See—*
Klein, Richard M.; and Samuel, Natansohn, 3,965,031.

GTE Sylvania Incorporated: *See—*
de Vos, Hendrik A. J., 3,965,451.
Scheithauer, William, Jr.; and Shaffer, Glenn Albert, 3,964,878.

Gudgel, Willard Leon: *See—*
Aylsworth, William Kenneth; Gudgel, Willard Leon; and Luoma, Richard William, 3,964,672.

Guditz, Elis A.; and Burke, Robert L., to Massachusetts Institute of Technology. Photoformed plated interconnection of embedded integrated circuit chips. 3,965,277, Cl. 427-43.000.

Gudkevich, Veniamin Mikhailovich: *See—*
Krupman, Leonid Isaakovich; Okonishnikov, Ary Mikhailovich; Sochnev, Alexandr Egorovich; Gavronsky, Boris Viktorovich; Popov, Viktor Alexeevich; Kalashnik, Anatoly Nikolaevich; Chumachenko, Vasily Sergeevich; Gudkevich, Veniamin Mikhailovich; Panev, Georgy Alexeevich; Detochka, Vasily Ivanovich; Telesov, Savely Adolfovich; Pokrass, Leonid Moiseevich; Ofengenden, Abram Mikhailovich; Nesterovich, Raisa Petrovna; and Zhitnik, Georgy Gavrilovich, 3,964,900.

Gueret, Jean-Louis H.: *See—*
Morane, Bruno R.; and Gueret, Jean-Louis H., 3,964,643.

Guerrero, Fernando V.: *See—*
Antonio, Anthony I.; and Guerrero, Fernando V., 3,964,339.
Antonio, Anthony I.; and Guerrero, Fernando V., 3,964,340.

Guerrino, David L.; and Cole, Richard W., Jr., to United States of America, Navy. Antenna for receiving VLF/LF transmission in seawater. 3,965,474, Cl. 343-719.000.

Gugeler, William G. Changeable color display device. 3,964,194, Cl. 40-106.210.

Gulf Research & Development Company: *See—*
Bash, David L.; and Lakshmanan, Pallavoor R., 3,965,061.
Gassett, Paul L.; and McLeod, Wilfred R., 3,964,423.
Heilman, William J.; and Lynch, Thomas J., 3,965,018.
Juvkam-Wold, Hans C., 3,964,557.
Kobylinski, Thaddeus P.; Taylor, Brian W.; and Vogel, Roger F., 3,965,040.
Lakshmanan, Pallavoor R., 3,965,060.

Gupta, Shyam K., to Pfizer Inc. Process for synthesizing methyl glyoxal acetals. 3,965,191, Cl. 260-594.000.

Gustafson, Manfred Wallace; and Loqvist, Kaj-Ragnar. Wave generator. 3,965,364, Cl. 290-53.000.

Guth, Kenneth C.: *See—*
Clinard, Glenn G.; Guth, Kenneth C.; Mulhollam, Gail R.; and Volk, Frank J., 3,965,470.

Gutmann, Karl, Jr.; and Eder, Rupert, to Karl Gutmann KG, Firma. Typewriter and bookkeeping machine work unit for the formation of a work unit chain. 3,964,401, Cl. 108-64.000.

Gutridge, Jack E.: *See—*
Miller, Roy W.; and Gutridge, Jack E., 3,964,399.

Gwynne, Thomas, to United States Gypsum Company. Manufacture of cementitious board. 3,964,944, Cl. 156-40.000.

H. C. Price Co.: *See—*
Horn, Roy L.; and Lane, M. Jack, 3,964,435.

H. W. Hart Mfg. Co.: *See—*
Hart, Harold W., 3,964,440.

Haase, Dietrich, to Hartung, Kuhn & Co. Maschinenfabrik GmbH. Method and apparatus for operating a leveling device for a coking oven. 3,964,977, Cl. 201-40.000.

Habgood, Gordon Alfred, to Girling Limited. Disc brake assembly having a releasable drag-taking member. 3,964,581, Cl. 188-73.300.

Hadden, William: *See—*
Metzger, Arthur C.; and Hadden, William, 3,964,694.

Haeuszer, Floyd A., to United States of America, Air Force. Radiation detection system. 3,965,471, Cl. 343-18.00E.

Haffer, Gregor: *See—*
Eder, Ulrich; Haffer, Gregor; Ruppert, Jurgen; Sauer, Gerhard; and Wiechert, Rudolf, 3,965,124.

Hagemann, Julius, to United States of America, Navy. Influence detecting gear with improved towing characteristics. 3,964,424, Cl. 114-235.00B.

Haglund, William A..; and Reiling, Theodore P. Perennial weed control by deep placement of volatile soil fumigants. 3,964,405, Cl. 111-6.000.

Hahm, Heinz Gunter; and Pocci, Nedo Igor, to ITT Industries, Inc. Brake shoe for spot-type disc brakes. 3,964,580, Cl. 188-73.100.

Hahn, Roger M.: *See—*
Grimes, Donald D.; Hahn, Roger M.; and Sheldon, Jerome F., 3,964,800.

Hahner, Reinhard; Reibetanz, Wilbert; and Wanner, Karl, to Robert Bosch G.m.b.H. Vacuum sweeper. 3,964,888, Cl. 55-274.000.

Hajos, Zoltan George, to Hoffmann-La Roche Inc. Stereospecific total steroidal synthesis via substituted c/d-trans indanones. 3,965,117, Cl. 260-340.300.

Hala, Alfred A., to Hohmann & Barnard, Inc. Insert and anchor positioning and locating device. 3,964,219, Cl. 52-105.000.

Hala, Alfred A.; and Schwalberg, Bernard J., to Hohmann & Barnard, Inc. Adjustable wall-tie reinforcing system. 3,964,226, Cl. 52-562.000.

Hala, Alfred A., to Hohmann & Barnard, Inc. Anchoring apparatus for fixedly spacing multiple wall constructions. 3,964,227, Cl. 52-568.000.

Halbert, Eric H.: *See—*
Eiben, Frank J.; Halbert, Eric H.; Jobe, William T.; and Siegmann, Carl, 3,964,659.

Halcon International, Inc.: *See—*
Ozero, Brian I., 3,964,980.

Hall, John B., to International Flavors & Fragrances Inc. 5- or 6-Acetyl-substituted 1-methyl-4-isopropyl-1,4-ethano-cyclohex-2-enes. 3,965,186, Cl. 260-586.00G.

Hall, Robert D.: *See—*
Jezl, James L.; Peters, Edwin F.; Hall, Robert D.; and Shepard, John W., 3,965,083.

Halliburton Company: *See—*
Farley, David L.; and Barrington, Burchus Q., 3,964,544.
Wray, Gary Q.; and Holden, John C., 3,964,305.

Hally, William Whytock; and Pate, Thomas, Jr. Mobile stone crushing plant. 3,964,719, Cl. 241-101.700.

Hamamura, Takayuki: *See—*
Nagata, Yasunori; Itoh, Hirotaka; Yazaki, Susumu; Hamamura, Takayuki; and Yoshiya, Shigeo, 3,964,279.

Hambleton, James; Davies, Peter Frank; Harley, Philip Edward; and Corsi, Gianfranco. Automatic graphing apparatus. 3,965,477, Cl. 346-33.00A.

Hamilton, Rose B.; and Yarus, Joan R. Tamper-proof garment hanger. 3,964,651, Cl. 223-91.000.

Hamlow, Eugene Emanuel; and Martin, Tellis Alexander, to Mead Johnson & Company. Crystalline ammonium N-acetyl-L-cysteinate and mucolytic process. 3,965,167, Cl. 260-534.00S.

Hammer, Thomas: *See—*
Sieber, Werner; Ganser, Friedrich; Hammer, Thomas; Viehrig, Wolfgang; Frick, Hans-Dieter; and Osegowitsch, Viktor, 3,964,191.

Handa, Ryoji: *See—*
Kamada, Kazumasa; Handa, Ryoji; and Hongo, Masafumi, 3,965,212.

Hansen, A. Boyd: *See—*
Reynolds, Gordon S.; and Hansen, A. Boyd, 3,964,484.

Hansen, David O.: *See—*
Roy, Neal L.; and Hansen, David O., 3,965,441.

Hansen, Ib, to F. L. Smidth & Co. Tube mill. 3,964,717, Cl. 241-71.000.

Hansen, Kenneth Peter: *See*—
Paduch, Stanley Raymond; and Hansen, Kenneth Peter, 3,964,253.

Hansen, Kent W.: *See*—
Davis, Earl K.; Hansen, Kent W.; and Silvis, Duane C., 3,964,920.

Hanson, Richard Eric; and Nolan, Thomas Edward, Jr., to RCA Corporation. Engine brake horsepower test without external load. 3,964,301, Cl. 73-116.000.

Hanzel, Joseph W.: *See*—
Foote, Kenneth R.; Hanzel, Joseph W.; and Froehner, Warren P., 3,964,393.

Hares, George B.; and Morgan, David W., to Corning Glass Works. Barium borosilicate optical glasses. 3,964,918, Cl. 106-47.00Q.

Hargadine, Curtis Dale: *See*—
Strong, Doyle L.; and Hargadine, Curtis Dale, 3,965,022.

Hargis, Ivan Glen; and Livigni, Russell Anthony, to General Tire & Rubber Company, The. Polymerization of monomers with alkaline earth metal organometallic compounds. 3,965,080, Cl. 526-183.000.

Hargital nee Franyo, Aniko: *See*—
Johan, Bela; Szemler, Laszlo; Fulop, Janos; Szontagh, Tamas; Simonovits nee Czink, Emilia; Bekes nee Erdos, Judit; Kuti, Laszlo; Toros, Robert; Szekely, Denes; Szabo, Laszlo; Seitz, Karoly; Vajda, Tade; Kovacs nee Komoroczy, Erzsebet; Hargital nee Franyo, Aniko; and Polinszky, Karoly, 3,964,971.

Harley, Philip Edward: *See*—
Hambleton, James; Davies, Peter Frank; Harley, Philip Edward; and Corsi, Gianfranco, 3,965,477.

Harlow, Ronald. Elevating device for snowmobiles. 3,964,729, Cl. 254-131.000.

Harmening, Wayne Arthur, to RCA Corporation. Steerable mount. 3,964,336, Cl. 74-501.00M.

Harmon Industries, Inc.: *See*—
Karr, Jerry W., 3,964,704.

Harper, William L.: *See*—
Bullock, Jonathan S.; Harper, William L.; and Peck, Charles G., 3,964,914.

Harrington, Frank C., to Continental Can Company, Inc. Method for packaging cheese curd. 3,965,271, Cl. 426-515.000.

Harrington, Wilfred Henry, to Dunlop Limited. Pneumatic tires. 3,964,532, Cl. 152-330.0RF.

Harris, Dwight L.: *See*—
Baak, N. Tryggve E. A.; and Harris, Dwight L., 3,965,241.

Harris, Glyn Islwyn; and Huckstepp, Brian George, to Albright & Wilson Limited. Curable composition of resin, cycloaliphatic epoxide and an amino compound. 3,965,211, Cl. 260-830.00R.

Harris, James C. Time to intercept measuring apparatus. 3,964,695, Cl. 244-3.160.

Harrison, Anthony William, to Girling Limited. Railway brakes. 3,964,579, Cl. 188-71.900.

Harrison, Anthony William, to Girling Limited. Thrust devices. 3,964,806, Cl. 308-235.000.

Harrison, Charles W.; and Senters, Glenn A., to Texaco Inc. Means for controlling the temperature of a depropanizer tower. 3,964,975, Cl. 196-132.000.

Harrison, Ian T.: *See*—
Pfister, Jurg R.; Harrison, Ian T.; and Fried, John H., 3,965,115.

Harrison, Roger Garrick, to Lilly Industries, Ltd. Preparation of α-acetoxy aldehydes and ketones. 3,965,157, Cl. 260-491.000.

Hart, Harold W., to H. W. Hart Mfg. Co. Poultry watering device. 3,964,440, Cl. 119-18.000.

Hart, Peter Brian; and Nicklin, Ralph, to Plessey Handel und Investments A.G. Methods of producing gallium phosphide yellow light emitting diodes. 3,964,940, Cl. 148-175.000.

Harte, James Richard. Instructional apparatus with movable blank sheet. 3,964,176, Cl. 35-9.00R.

Hartford, Thomas William, to Bendix Corporation, The. Digital engine control system using DDA schedule generators. 3,964,443, Cl. 123-32.0EA.

Hartley Controls Corporation: *See*—
Hartley, Nelson, 3,964,732.

Hartley, Nelson, to Hartley Controls Corporation. Apparatus for mixing molding sand. 3,964,732, Cl. 259-10.000.

Hartman, Arlin P.; and Vance, Richard A., to Universal Bleacher Company. Folding handrails for telescoping seating sections. 3,964,215, Cl. 52-9.000.

Hartung, Kuhn & Co. Maschinenfabrik GmbH: *See*—
Haase, Dietrich, 3,964,977.

Hartwell Corporation: *See*—
Poe, L. Richard, 3,964,364.

Harvard Apparatus Company, Inc.: *See*—
Kleinmann, Aaron Joseph; Norton, Robert Leo; and Radis, Morton Irving, 3,964,139.

Harvey, David C., Jr. Mallet game. 3,964,748, Cl. 273-138.00R.

Harvey, Gerald J., to New York Testing Laboratories, Inc. Energy system for production of hydrogen from waste incineration. 3,965,362, Cl. 290-1.00R.

Harwood, Keith, to L.M. Ericsson Pty. Ltd. Digital control processor. 3,965,457, Cl. 340-172.500.

Haszeldine, Robert Neville: *See*—
Banks, Ronald Eric; and Haszeldine, Robert Neville, 3,965,184.

Hata, Kazuhiko: *See*—
Hirooka, Masaaki; Fujii, Yoshikazu; Morita, Shigeru; Namazue, Isamu; and Hata, Kazuhiko, 3,964,955.

Hatsukano, Yoshikazu, to Hitachi, Ltd. MISFET (Metal-insulator-semiconductor field-effect transistor) logical circuit having depletion type load transistor. 3,965,369, Cl. 307-221.00C.

Haubner, Georg: *See*—
Wesemeyer, Jurgen; Schrumpf, Hans; Meier, Werner; and Haubner, Georg, 3,964,461.

Hauck, Frederic Peter; and Sundeen, Joseph E., to E. R. Squibb & Sons, Inc. 1,2,3,4,6,7,8,8a-Octahydro-6-aryl-isoquinolines and derivatives thereof. 3,965,102, Cl. 260-286.00R.

Hautaniemi, B. Wendell: *See*—
Jorgensen, Hans G.; and Hautaniemi, B. Wendell, 3,964,297.

Hayakawa, Toshio: *See*—
Sakamoto, Naraji; Mitsui, Tatsuo; and Hayakawa, Toshio, 3,965,479.

Hayashi, Tsunekazu: *See*—
Takase, Takashi; Hayashi, Tsunekazu; and Saitoh, Hirokazu, 3,965,281.

Hayes, John T., Jr.: *See*—
Stocker, Charles T.; Schara, Robert E.; Marshall, William E.; Hayes, John T., Jr.; and Glicksman, Martin, 3,965,268.

Headway Research, Inc.: *See*—
Shipman, Vern D., 3,965,381.

Hecht, Charles L., to S.K.H. & S., Inc. Air pickup system for strawberry pickers. 3,964,245, Cl. 56-331.000.

Hecklinger, Clarence Frederick; and Crook, Donald Edward, to Allied Chemical Corporation. Recovery of sodium nitrite from by-product process liquors containing sodium chloride. 3,965,247, Cl. 423-385.000.

Heeks, John Stuart: *See*—
Craven, George Frederick; Heeks, John Stuart; and Marshall, Graham, 3,965,446.

Heilman, William J.; and Lynch, Thomas J., to Gulf Research & Development Company. Process for preparing a concentrate of a polyalpha-olefin in a lubricating oil base stock. 3,965,018, Cl. 252-59.000.

Heimbach, Paul: *See*—
Wilke, Gunther; and Heimbach, Paul, 3,965,142.

Heimberger, Helmut, to Opti-Holding AG. Slide-fastener halves. 3,964,135, Cl. 24-205.10C.

Heinemann Electric Company: *See*—
Schilling, Keith L., 3,965,450.

Heinzman, Homer W., to LTV Aerospace Corporation. Apparatus for protecting a multiphase power transmission line from intermembral faults. 3,965,394, Cl. 317-18.00R.

Helger, Roland: *See*—
Banauch, Dieter; Brummer, Wolfgang; Ebeling, Wolfgang; Helger, Roland; Hennrich, Norbert; and Lang, Hermann, 3,964,974.

Helgesson, Alan L., to SHM Nuclear Corporation. Automatic frequency control system for driving a linear accelerator. 3,965,434, Cl. 328-233.000.

Hella, Terry A., to TEC Systems, Inc. Air bar assembly for web handling apparatus. 3,964,656, Cl. 226-97.000.

Heller, William C., Jr.: *See*—
Shatzkin, Leonard, 3,964,769.

Helmberger, Josef: *See*—
Wick, Richard; Bestenreiner, Friedrich; Deml, Reinhold; and Helmberger, Josef, 3,965,291.

Hemmann, Rainer; and Steinmann, Helmut, to Robert Bosch G.m.b.H. Control circuit for an electromotor. 3,964,444, Cl. 123-41.490.

Hendricks, Udo-Winfried, to Bayer Aktiengesellschaft. Phosphonocarboxylic acid esters. 3,965,147, Cl. 260-478.000.

Henkel & Cie G.m.b.H.: *See*—
Koppensteiner, Gunter; Eckert, Hans-Werner; and Wehle, Volker, 3,965,265.
Krause, Horst-Jurgen, 3,965,170.
Krause, Horst-Jurgen, 3,965,171.
Schmadel, Edmund; Jakobi, Gunter; Worms, Karl-Heinz; and Blum, Helmut, 3,965,024.

Henning, Kurt; and Bonisch, Horst, to Polysius AG. Apparatus for lubricating bearing rings loosely mounted on a rotary drum. 3,964,804, Cl. 308-109.000.

Hennings, Werner, to Bunde Glass GmbH. Container for an injection liquid, in the form of a flask closed by a curl-on cap. 3,964,627, Cl. 215-247.000.

Hennrich, Norbert: *See*—
Banauch, Dieter; Brummer, Wolfgang; Ebeling, Wolfgang; Helger, Roland; Hennrich, Norbert; and Lang, Hermann, 3,964,974.

Hensley, Donald W. Snap attaching tool. 3,964,660, Cl. 227-15.000.

Herd, Elmer R. Agricultural broadcasting apparatus. 3,964,681, Cl. 239-650.000.

Hermann Berstorff Maschinenbau GmbH: *See*—
Wockener, Willi, 3,964,848.

Hermann Finckh Metalltuch- und Maschinenfabrik: *See*—
Holz, Emil; and Kapernick, Reinhold, 3,964,996.

Herold, Stanley J.; Lagrange, Donald E.; and Laswell, John E., to United States of America, Navy. Spin actuated release mechanism. 3,964,396, Cl. 102-79.000.

Herr Manufacturing Company, Inc.: *See*—
Atwood, Hyatt B.; and McLean, James N., 3,964,576.

Herritt, Ethel R.: *See*—
Bialousz, Lorraine R.; Herritt, Ethel R.; Lartigue, Donald J.; and Pitcher, Wayne H., Jr., 3,965,035.

Hesch, Rolf, to Becker & van Hullen Niederrheinische Maschinenfabrik. Method for storing bagasse. 3,964,961, Cl. 162-96.000.

Hesse, Horst; Kobald, Walter; Gand, Heinz; Hoheisel, Rainer; Sopha, Klaus; Flaschar, Heinz; Kleinschmidt, Heinz; Arnold, Winfried; and Zeuch, Werner, to Robert Bosch G.m.b.H. Electrohydraulic control unit. 3,964,518, Cl. 137-625.640.

Hesselgren, Sven-Gunnar. Method of applying preventive and therapeutic agents. 3,964,164, Cl. 32-1.000.

Hesterman, Victor W., to Develco, Inc. Gradient wound trim coil for trimming a primary pickup coil. 3,965,411, Cl. 323-44.00F.

Heusler, Helmut; Braun, Emil; and Hofling, Peter, to O & K Orenstein & Koppel Aktiengesellschaft. Conveyor, especially autowalks for persons. 3,964,596, Cl. 198-16.0MS.

Hewlett-Packard Company: *See—*
Bronson, Barry Steven, 3,965,468.
Mei, Kenyon Chi-Yen, 3,965,367.

Hewlett-Packard Limited: *See—*
Coackley, Robert; Urquhart, John Reid; and Dack, David George, 3,965,424.

Heywang, Walter, to Siemens Aktiengesellschaft. Electroluminescent semiconductor diode with hetero-structure. 3,965,347, Cl. 250-211.00J.

Hiab-Foco Aktiebolag: *See—*
Lindqvist, Jonas Herman, 3,964,777.

Hickey, Thomas Nelson; and Spulgis, Ivars Sigurds, to CVI Corporation. Radioactive gas standby treatment apparatus with high efficiency rechargeable charcoal filter. 3,964,887, Cl. 55-267.000.

Hicks, Raymond John, to Vickers Limited. Gears. 3,964,334, Cl. 74-410.000.

Hidy, Phil H.; and Baldwin, Robert S., to Commercial Solvents Corporation. Method of preventing pregnancy with lactone derivatives. 3,965,274, Cl. 424-279.000.

Hidy, Phil H.; and Baldwin, Robert S., to Commercial Solvents Corporation. Composition and method. 3,965,275, Cl. 424-279.000.

Higuchi, Hobart Atsushi; and Trubell, Lawrence Paul, to International Business Machines Corporation. Controlled ferroresonant transformer regulated power supply. 3,965,408, Cl. 321-25.000.

Hildebrandt, Darrell Edward: *See—*
Feldwick, Raymond Douglas; and Hildebrandt, Darrell Edward, 3,965,042.

Hill, James David; Isbell, Gene Austin; and Williams, Thomas Hampton, to International Business Machines Corporation. Font selection system. 3,964,591, Cl. 197-1.00R.

Hill, Robert Dickson. Electrically conductive object having an ablative layer thereon for protecting the same from damage by an electrical discharge. 3,965,285, Cl. 174-2.000.

Hillery, Robert V.: *See—*
Bessen, Irwin I.; Betts, Robert K.; and Hillery, Robert V., 3,964,877.

Himics, Richard Joseph; Graham, Scott Oliver; and Ross, Daniel Louis, to RCA Corporation. Method of preparing a pattern on a silicon wafer. 3,964,909, Cl. 96-36.200.

Himmelstein, Kenneth J., to Dow Chemical Company, The. Regeneration of activated carbon with a solution of sorbed species in a solvent. 3,965,036, Cl. 252-414.000.

Hinrichs, Helmut, to Chemie Linz Aktiengesellschaft. Process for the production of ammonia using aligned catalyst particles. 3,965,246, Cl. 423-361.000.

Hirai, Kazumi, to Matsushita Electric Industrial Co., Ltd. Microwave oven. 3,965,325, Cl. 219-10.55R.

Hirano, Hironori: *See—*
Arimura, Iwao; Sato, Akio; and Hirano, Hironori, 3,964,533.

Hiraoka, Hiroyuki: *See—*
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Hirose, Takeshi; Oishi, Yasushi; and Sakai, Tadao, to Fuji Photo Film Co., Ltd. Color photograhic material having a bleach inhibitor therein defining a sound track. 3,964,905, Cl. 96-4.000.

Hirschkoff, Sidney, to McCulloch Corporation. Safety braking mechanism for a portable chain saw. 3,964,333, Cl. 30-381.000.

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Ho, Kok-Kit, to Timex Corporation. Adjustable hinge band. 3,964,252, Cl. 59-80.000.

Hoar, Charles L.: *See—*
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Hoch, Dieter: *See—*
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Hochstrasser, Harry, to Becton, Dickinson and Company. Method and device for detecting glucose. 3,964,871, Cl. 23-253.0TP.

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Holly, James A., to Hollymatic Corporation. Molding apparatus. 3,964,114, Cl. 17-32.000.

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Huhnen, Joachim Walter Gerhard. Helical extension spring and method of making same. 3,964,736, Cl. 267-166.000.
Hujsak, Karol L.; and Buxton, Thomas S., to Amoco Production Company. Recovery of heavy hydrocarbons from underground formations. 3,964,547, Cl. 166-269.000.
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Humphrey, William E., to Humphrey Instruments, Inc. Remote stereo microscope with field mirror reflected ocular paths. 3,964,818, Cl. 350-36.000.
Hunkeler, Ernst J., to Gleason Works, The. Large gear manufacture. 3,964,369, Cl. 90-5.000.
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Husted, Royce H., to Saroy Engineering. Power driven ski. 3,964,560, Cl. 180-5.00R.
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Jackson, George F. Gravity clarifier. 3,965,013, Cl. 210-519.000.

Jackson, Jesse Milne, to Bell Telephone Laboratories, Incorporated. Gas detecting apparatus and methods. 3,964,292, Cl. 73-40.50R.

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Jamison, Will B., to Consolidation Coal Company. Method and apparatus for mining and supporting the mine roof. 3,964,265, Cl. 61-45.00C.

Jandrasi, Frank J.; and Purvis, Howard A., to Tapco International, Inc. Slide valve with integrated removable internals. 3,964,507, Cl. 137-375.000.

Janke, William R. Tamper-proof weather cover device for exhaust pipes. 3,964,376, Cl. 98-59.000.

Janning, John L. Method of making a liquid crystal display cell. 3,964,158, Cl. 29-592.000.

Janssens, Wilhelmus; Claeys, Daniel Alois; Lemahieu, Raymond Gerard; and Dierckx, Jozef Aime, to AGFA-GEVAERT N.V. Thermographic recording material. 3,965,282, Cl. 428-341.000.

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Jin, Jung Il, to Stauffer Chemical Company. Fire retardant crosslinked copolymers. 3,965,216, Cl. 260-897.00C.

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Johannsen, Thomas J. Flexile core material for laminated structures and method of producing the same. 3,964,354, Cl. 83-39.000.

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Johnson, Morris A.; Reedy, James D.; and Yang, Kang, to Continental Oil Company. Method for preparing tetrabutylammonium bromide. 3,965,178, Cl. 260-567.60M.

Johnson, Robert Carol, to Modulus Corporation. Strain indicator. 3,964,299, Cl. 73-88.00F.

Johnston, Orin B. Heat bonding device. 3,964,958, Cl. 156-382.000.

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Jones, Derick; and Lu, Sun, to Texas Instruments Incorporated. Lyotropic nematic liquid crystals for use in electro-optical display devices. 3,965,030, Cl. 252-299.000.

Jones, Evan Thomas Richard; and Fishburn, Robert Anthony, to Foseco International Limited. Additives to improve slag formation in steelmaking furnaces. 3,964,899, Cl. 75-53.000.

Jones, Louis L., Jr.; and Wood, William J., to Canton Textile Mills, Inc. Textile card crush roll operating system and method. 3,965,401, Cl. 318-6.000.

Jones, Maurice J., to Monsanto Company. Tubular spinnerette assembly. 3,964,855, Cl. 425-463.000.

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Jones, Wilson Franklin; and Watkins, Arthur Gene, to San/Bar Corporation. Line card circuit. 3,965,308, Cl. 179-99.000.

Jordan, Mary Ann McClurkin. Event calendar. 3,964,195, Cl. 40-107.000.

Jorgensen, Hans G.; and Hautaniemi, B. Wendell, to Ithaco, Incorporated. Ultrasonic inspection apparatus. 3,964,297, Cl. 73-67.80R.

Joseph, John S.; and Levinson, Edwin B., to Sundstrand Data Control, Inc. Dual sound system. 3,964,826, Cl. 352-10.000.

Joseph Lucas (Industries) Limited: *See—*
Bottoms, Harry Simister; and Holliday, Leslie, 3,964,885.

Joslyn, Gerald L.; and Bingley, George W., to Massey-Ferguson Inc. Reversible seat lock. 3,964,713, Cl. 248-418.000.

Jouppi, Eino J. Grapple. 3,964,778, Cl. 294-88.000.

Joyeux, Michel: *See—*
Schulte-Elte, Karl-Heinrich; Joyeux, Michel; and Ohloff, Gunther, 3,965,189.

Judith, Hans; and von Schwerdtner, Otto A., to Kraftwerk Union Aktiengesellschaft. Means and method for separation of water from steam-water mixture. 3,964,884, Cl. 55-184.000.

Judson, Donald W., to Birtcher Corporation, The. Uncomplicated load-adapting electrosurgical cutting generator. 3,964,487, Cl. 128-303.140.

Junker, Arnold E.; and Massaro, Anthony J., to Avco Corporation. Controlled aperture seal. 3,964,753, Cl. 277-26.000.

Jureit, John Calvin; Leutwyler, Roy; Brodsky, Larry; Kushner, Benjamin; Seipos, Andrew G.; and Castillo, Adolfo, to Automated Building Components, Inc. Apparatus for forming wooden joints. 3,964,663, Cl. 227-95.000.

Jurisch, Louis A., to Commercial Solvents Corporation. Compositions of polystyrene reacted with hexamethoxymethylmelamine. 3,965,082, Cl. 526-19.000.

Justrite Manufacturing Company: *See—*
Flider, Frank S., 3,964,728.

Juvkam-Wold, Hans C., to Gulf Research & Development Company. Treatment of weighted drilling mud. 3,964,557, Cl. 175-66.000.

Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft: *See—*
Werwitzke, Lothar; Stenzel, Hans-Dieter; and Voigt, Hermann Uwe, 3,965,226.

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Steinmetz, Dietmar, 3,964,801.

Kabushiki Kaisha Komatsu Seisakusho: *See—*
Kawamura, Eiji; Nishimura, Yoshitaka; and Fukumoto, Hisashi, 3,964,562.

Kabushiki Kaisha Morita Seisakusho: *See—*
Matsui, Takahiro; and Uwamori, Osamu, 3,964,725.

Kacerek, John. Model railroad train control system. 3,964,701, Cl. 246-2.00F.

Kaeding, Warren William: *See—*
Butter, Stephen Allan; and Kaeding, Warren William, 3,965,208.

Kaelin, Joseph Richard. Apparatus for biological purification of an effluent. 3,965,009, Cl. 210-218.000.

Kageyama, Kunio: *See—*
Someya, Yoshiaki; Tateno, Noriaki; and Kageyama, Kunio, 3,965,140.

Kahn, Manfred: *See—*
Moorhead, William L.; and Kahn, Manfred, 3,965,392.

Kaiser Aluminum & Chemical Corporation: *See—*
Gane, Gordon R., 3,964,414.

Kaiser, Hans; and Kopf, Arthur, to Gebruder Junghans GmbH. Electrical primer for projectiles. 3,964,395, Cl. 102-70.20R.

Kakuda, Minoru: *See—*
Shin, Hiroshi; Sugano, Junichiro; Yoshii, Tadashi; Iwamoto, Kichiro; Kuriyama, Yasuhisa; and Kakuda, Minoru, 3,965,251.

Kalashnik, Anatoly Nikolaevich: *See—*
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Kalbitz, Wolfgang; Keyl, Erwin; Nitsche, Herbert; and Scherbaum, Friedrich, to Siemens Aktiengesellschaft. Pluggable high-amperage contact. 3,964,814, Cl. 339-64.00R.

Kalippke, Harald; and Brand, Gunter, to Robert Bosch G.m.b.H. Internal combustion engine electric ignition breaker contact structure. 3,964,453, Cl. 123-146.50A.

Kaltz, Milton C.: *See—*
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Kalugin, Oleg Mikhailovich: *See—*
Vexelman, Ilya Volfovich; Sljudikov, Leonid Davydovich; Kutilin, Alexandr Grigorievich; and Kalugin, Oleg Mikhailovich, 3,964,303.

Kamada, Kazumasa; Handa, Ryoji; and Hongo, Masafumi, to Mitsubishi Rayon Co., Ltd. Flame-resistant resin composition. 3,965,212, Cl. 260-835.000.

Kamelmacher, Eduard. Blade for a centrifugal pump impeller. 3,964,840, Cl. 416-183.000.

Kameo, Takashi: *See—*
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Kanebo, Ltd.: *See—*
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Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See—*
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Kaneko, Mikio: *See—*
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Kangle, Purushottam Janardan; Werdenberg, Hermann; Artz, Klaus; Ramanathan, Visvanathan; Naik, Navnitrai Nagirji; and Milicevic, Branimir, to Ciba-Geigy AG. Process for dyeing and printing textile materials of synthetic organic fibers. 3,964,862, Cl. 8-176.000.

Kao, Paul W.; and Lamborn, Homer C., to United States Pipe and Foundry Company. Bevel pipe winding method and product. 3,964,521, Cl. 138-176.000.

Kao, Paul W.; and Lamborn, Homer C., to United States Pipe and Foundry Company. Bevel pipe winder. 3,964,522, Cl. 242-7.220.

Kapernick, Reinhold: *See—*
Holz, Emil; and Kapernick, Reinhold, 3,964,996.

Kapit, Wynn. Portable unisex urinal. 3,964,110, Cl. 4-99.000.

Kaplan, Edward L.: *See—*
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Kapsambelis, Christos B.: *See—*
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Karcher, Karl-Friedrich: *See—*
Wagner, Heinrich; Karcher, Karl-Friedrich; and Merkle, Otto, 3,964,371.

Karden, Karl Gosta, to Atlas Copco Aktiebolag. Pneumatic grinding machine provided with dust removing means. 3,964,212, Cl. 51-170.0PT.

Karinkanta, Hannu Henrik. Injecting device of a solvent-free sample for a gas analyzer. 3,964,872, Cl. 23-259.000.

Karl Gutmann KG, Firma: *See—*
Gutmann, Karl, Jr.; and Eder, Rupert, 3,964,401.

Karnik, Stanley D.; and Morgan, Terry E. Floating campground. 3,964,418, Cl. 114-70.000.

Karr, Jerry W., to Harmon Industries, Inc. Operating mechanism for railroad crossing gate. 3,964,704, Cl. 246-125.000.

Kasamura, Toshiro: *See—*
Tanaka, Hidetoshi; Kasamura, Toshiro; and Sato, Tadashi, 3,964,827.

Kashio, Toshio, to Casio Computer Co., Ltd. Printing mechanism for printing characters. 3,964,592, Cl. 197-49.000.

Katayama, Nobuaki; Tsuzuki, Isao; and Kaneko, Mikio, to Toyota Jidosha Kogyo Kabushiki Kaisha. Fixing device for speed meter driven gear. 3,964,321, Cl. 74-12.000.

Katoh, Hiroshi; and Fujita, Mitsuo, to Victor Company of Japan, Limited. Tape recording apparatus for editing recording. 3,965,483, Cl. 360-14.000.

Katz, Joel; and Pousson, James R., to United States of America, Air Force. Spectrum-shape discriminating on/off target indicator. 3,965,428, Cl. 325-474.000.

Katz, Louis: *See—*
Honey, Raymond W.; and Katz, Louis, 3,965,341.

Kaufmann, James J.: *See—*
Britz, William J.; Boshers, William A.; and Kaufmann, James J., 3,964,928.

Kausz, Ivan; Stunkel, Helmut; and Wille, Harald, to Siemens Aktiengesellschaft. Pressurized-water reactor coolant gas disposal system. 3,964,965, Cl. 176-37.000.

Kawabuchi, Isamu: *See—*
Nishi, Atsuyoshi; Kawabuchi, Isamu; Yashiro, Katuo; Ono, Kenichi; and Furuya, Yoshiaki, 3,964,859.

Kawamura, Eiji; Nishimura, Yoshitaka; and Fukumoto, Hisashi, to Kabushiki Kaisha Komatsu Seisakusho. Steering system for an endless track type tractor. 3,964,562, Cl. 180-6.700.

Kawasaki Jukogyo Kabushiki Kaisha: *See—*
Nishida, Toyomi; Sohma, Hiroshi; and Ito, Hayami, 3,964,922.

Kazakov, Vladimir Pavlovich: *See—*
Chaplits, Donat Nikolaevich; Kazakov, Vladimir Pavlovich; Lazariants, Emmanuil Gabrielovich; Chebotaev, Vladimir Filippovich; Balashov, Mikhail Ivanovich; and Serafimov, Leonid Antonovich, 3,965,039.

Kedem, Ora: *See—*
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Keller, Peter: *See—*
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Kelly, Joe T., deceased (by Kelly, LaVerne S., executrix), to Marathon Oil Company. $H_2O_2$-containing micellar dispersions. 3,964,994, Cl. 208-196.000.

Kelly, LaVerne S., executrix: *See—*
Kelly, Joe T., deceased, 3,964,994.

Kelm, Everett F.: *See—*
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Kelton, Grady A., to Avis Industrial Corporation. Locking mechanism. 3,964,280, Cl. 70-84.000.

Kemp, Donald W.: *See—*
DiCola, Louis S.; Kemp, Donald W.; and Evans, H. Duane, 3,964,868.

Kennedy, Sterling R. Method for reactivating carbon. 3,965,037, Cl. 252-415.000.

Kenney, John Thomas, to Western Electric Company, Inc. Method of forming a hydrophobic surface by exposing a colloidal sol to UV radiation. 3,964,906, Cl. 96-33.000.

Kent, James A. Ski binding. 3,964,758, Cl. 280-613.000.

Kent, Jan Herbert Farquharson: *See—*
Kent, Peter Jan; Phillips, John Eric; and Kent, Jan Herbert Farquharson, 3,964,949.

Kent Manufacturing Co., Inc.: *See—*
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Kent, Peter Jan; Phillips, John Eric; and Kent, Jan Herbert Farquharson, to Kentredder Limited. Method of treading tires. 3,964,949, Cl. 156-96.000.

Kent State University: *See—*
Arora, Sardari L., 3,965,029.

Kentredder Limited: *See—*
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Keplinger, Edward G.: *See—*
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Kerb, Ulrich: *See—*
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Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung: *See—*
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Kerridge, John Charles; and Syson, John William, to Imperial Chemical Industries Limited. Alkyd resin. 3,965,059, Cl. 260-22.0CB.

Kesselring, Lutz, to MAPA GmbH. Soothing teat. 3,964,489, Cl. 128-360.000.

Kessler, Hans-Joachim: *See—*
Biere, Helmut; Ulbrich, Hermann; Kessler, Hans-Joachim; and Redmann, Ulrich, 3,965,103.

Kestenman Bros. Mfg. Co.: *See—*
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Ketz, George, Jr.: *See—*
LaBelle, Joan P.; and Ketz, George, Jr., 3,964,709.

Kevorkian, Kevork, to International Standard Electric Corporation. Folded space-time-space switching network. 3,965,301, Cl. 179-15.0AT.

Keyl, Erwin: *See—*
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Kicon AG: *See—*
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Kieper, Reinhold R. Power transmission. 3,964,322, Cl. 74-55.000.

Kihara, Toshiyuki, to Yoshida Kogyo Kabushiki Kaisha. Slide fastener. 3,964,137, Cl. 24-205.16R.

Kikuchi, Kunio, to Mikuni Kogyo Kabushiki Kaisha. Carburetor. 3,964,503, Cl. 137-39.000.

Kim, Chung Kyu, to Raytheon Company. Avalanche semiconductor amplifier. 3,965,437, Cl. 330-34.000.

Kim, Duk Hwang, to Boeing Company, The. Method and apparatus for controlling the degree of hydration in sealing of anodized aluminum. 3,964,982, Cl. 204-1.00T.

Kim, Kwan Chi. Mop holder and brush combination. 3,964,121, Cl. 15-115.000.

Kimberley, John A., to Ambac Industries, Inc. Universal fuel injection system controller. 3,964,459, Cl. 123-140.0FG.

King, Cary J., to University of California, The Regents of the. Controlled humidity freeze drying process. 3,964,174, Cl. 34-5.000.

King, David W.: *See—*
Gearhart, Marvin; King, David W.; Mendoza, Rudolph R.; Scherbatskoy, Serge A.; and Young, James D., 3,964,556.

Kinney, Bruce W., Jr.: *See—*
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Kinosz, Donald L., to Aluminum Company of America. Anti-pollution method. 3,965,249, Cl. 423-497.000.

Kinsolving, C. Richard: *See—*
Carr, Albert A.; and Kinsolving, C. Richard, 3,965,257.

Kintish, Irving L.; and Marcus, Irwin, to United States of America, Army. Land mine (U). 3,964,392, Cl. 102-8.000.
Kiraly, Raymond J.; Affeldt, Bernard H.; and Anspach, Charles R., to United States of America, Navy. Boiler reactor. 3,964,416, Cl. 114-20.00A.
Kirby, Charles Ray: *See—*
Swinkels, Godefridus Maria; Furber, Robert Arthur; Milner, Edward Francis Godfrey; Genik-Sas-Berezowsky, Roman Michael; and Kirby, Charles Ray, 3,964,901.
Kitao, Teijiro: *See—*
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Kitsuda, Kaname. Shaping apparatus and a method for producing a seamless container. 3,964,412, Cl. 113-7.00R.
Klaar, Jochen: *See—*
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Klautschek, Herwig, to Siemens Aktiengesellschaft. D-C control element circuit. 3,965,409, Cl. 321-45.00C.
Klein, Richard M.; and Samuel, Natansohn, to GTE Laboratories Incorporated. Red emitting phosphors. 3,965,031, Cl. 252-301.40R.
Kleiner, Eduard K.; and Falk, Robert A., to Ciba-Geigy Corporation. Perfluoroalkyl alcohols. 3,965,148, Cl. 260-481.00R.
Kleiner, Frank; Becker, Wolfgang; and Muller, Karl Heinz, to Bayer Aktiengesellschaft. Foamed polyolefin foils. 3,965,053, Cl. 260-2.5HA.
Kleinmann, Aaron Joseph; Norton, Robert Leo; and Radis, Morton Irving, to Harvard Apparatus Company, Inc. Syringe holder. 3,964,139, Cl. 24-254.000.
Kleinschmidt, Heinz: *See—*
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Klopotek, Alojzy; Profic, Jan; Uminski, Jerzy; and Dziala, Gabriela, to Instytut Chemii Przemyslowej. Method for manufacturing alkaline detergents and desinfectants. 3,965,025, Cl. 252-106.000.
Kmecak, Ronald A.; and Kovach, Stephen M., to Ashland Oil, Inc. Hydrogen production. 3,965,252, Cl. 423-651.000.
Kmetyko, Joseph. Headrest for vehicles. 3,964,788, Cl. 297-395.000.
Knapp, Peter A. Pivot pin adapter assembly. 3,964,799, Cl. 308-2.00R.
Knauff, Paul A.: *See—*
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Knight Engineering and Molding Co.: *See—*
Jasinski, Andrew S.; and McKirnan, Robert A., 3,964,634.
Knight, Ralph. Unitary device and method for screen manufacture and printing. 3,964,385, Cl. 101-128.400.
Knipe, Earl Albert, to Rexnord Inc. Rotary mower blade with detachable tines. 3,964,243, Cl. 56-17.500.
Knollmueller, Karl O., to Olin Corporation. Alkoxysilanol cluster compounds and their preparation. 3,965,135, Cl. 260-448.80A.
Knollmueller, Karl O., to Olin Corporation. Alkoxysilane cluster compounds and their preparation. 3,965,136, Cl. 260-448.80A.
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Kobylinski, Thaddeus P.; Taylor, Brian W.; and Vogel, Roger F., to Gulf Research & Development Company. Process for preparing catalyst. 3,965,040, Cl. 252-435.000.
Koch, Peter; and Beyer, Eduard, to Gebrueder Buehler AG. Method for pressure casting. 3,964,537, Cl. 164-136.000.
Kodama, Takashi: *See—*
Shimogawa, Sachio; Fujio, Takashi; Arika, Mikio; Yamada, Nobuo; Kodama, Takashi; and Nakata, Tetsuya, 3,965,050.
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Kogure, Katsura; and Nakagawa, Kunio, to Nisshin Flour Milling Co., Ltd. Process of producing a 2-(4-alkylphenyl)-propionic acid. 3,965,161, Cl. 260-523.00R.
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Kohkoku Chemical Industry Co., Ltd.: *See—*
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Kohno, Toshiyuki; and Imaizumi, Kenichi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Rotary piston internal combustion engine. 3,964,446, Cl. 123-8.130.
Kolk, Stephen B.: *See—*
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Komatsu, Ikuo I., to Sunbeam Corporation. Combined hair styler and detangler. 3,964,502, Cl. 132-11.00A.
Kondo, Shinichi: *See—*
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van Langen, Jean Marie; Jacobs, Gerardus Wilhelmus Cornelis; and de Jong, Gerrit, 3,964,599.
Konishi, Kenzo; Kotone, Akira; Nakane, Yoshihiko; Kitao, Teijiro; and Yamase, Iro, to Sakai Chemical Industry Company Ltd. Trisazo dye containing a diphenylenesulfone structure. 3,965,087, Cl. 260-152.000.
Konnikov, Mikhail Naumovich; Nakul, Ivan Savvich; Novikov, Leonid Kuzmich; Zemlyansky, Evgeny Stepanovich; and Shulman, Peter Tankhomovich. Semiautomatic diamond tool-grinding machine. 3,964,209, Cl. 51-5.00R.
Konrad, Eugen: *See—*
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Kopaska, Arnold F., to Koehring Company. Rotary baler. 3,964,246, Cl. 56-341.000.
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Kopp, Hans, to Georg Fischer Aktiengesellschaft. Cast one-piece annular rim member for a vehicle wheel. 3,964,144, Cl. 29-159.100.
Koppensteiner, Gunter; Eckert, Hans-Werner; and Wehle, Volker, to Henkel & Cie G.m.b.H. Antimicrobial agents for water conservation. 3,965,265, Cl. 424-204.000.
Kopstein, Joseph Jay by said Joan P. LaBelle and George Ketz, Jr.: *See—*
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Kornylak, Andrew T., to Kornylak Corporation. Conveyor having provision for discharging loads at an angle generally transverse to the line of travel or the conveyor. 3,964,588, Cl. 193-36.000.
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Korsch, Alfred; and Schneiders, Friedrich, to D. Dupuis & Co. Apparatus for treating textile materials. 3,964,278, Cl. 68-5.00E.
Kotaro, Matumoto, to Dai Nippon Insatsu Kabushiki Kaisha. Apparatus for continuous pushing out of sheet product from blank. 3,964,655, Cl. 225-97.000.
Kotone, Akira: *See—*
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Kozai, Tetsuo, to Morita Pump Kabushiki Kaisha. Device for automatically detecting overload on aerial ladder truck. 3,965,464, Cl. 340-267.00C.
Kraftwerk Union Aktiengesellschaft: *See—*
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Krause, Horst-Jurgen, to Henkel & Cie G.m.b.H. Process for the production of ether polycarboxylic acids. 3,965,170, Cl. 260-535.00P.
Krause, Horst-Jurgen, to Henkel & Cie G.m.b.H. Process for the production of ether polycarboxylic acids. 3,965,171, Cl. 260-535.00P.
Krauss-Maffei Aktiengesellschaft: *See—*
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Kreidler, Alfred; and Viessmann, Klaus. Apparatus for thermally treating metal components. 3,964,734, Cl. 266-133.000.
Kremer, Paul A.; and Gora, Bernhard N., to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Method of joining stiffening material to shoe upper using ultra high frequency radiation. 3,964,951, Cl. 156-272.000.
Krenzer, John, to Velsicol Chemical Corporation. Thiadiazolylimidazolidinone herbicides. 3,964,895, Cl. 71-90.000.
Kress, Manfred: *See—*
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Kriedt, Hans; Shatter, Eckart; and Zulauf, Jean-Marc, to Siemens Aktiengesellschaft. Circuit for demodulating an amplitude modulated signal. 3,965,435, Cl. 329-101.000.
Krieger, Heinrich. Process and arrangement for cooling fluids. 3,964,891, Cl. 62-9.000.
Krivakova, Miroslava: *See—*
Hradil, Jiri; Coupek, Jiri; Krivakova, Miroslava; Stamberg, Jiri; Stoy, Arthur; and Turkova, Jaroslava, 3,964,973.
Kroeker, Elmer Leroy Bob, to International Business Machines Corporation. Translatable stacker apparatus. 3,964,741, Cl. 271-213.000.
Krofchak, David, to David Krofchak Limited. Recovery of sodium thiocyanate. 3,965,243, Cl. 423-226.000.
Kropac, Joseph M., to Xerox Corporation. Manifold imaging member and process employing a dark charge injecting layer. 3,964,904, Cl. 96-1.500.
Kropfhammer, Georg. Inhaler apparatus. 3,964,478, Cl. 128-203.000.
Kropp, William E.: *See—*
Viker, Harris W.; and Kropp, William E., 3,964,415.
Krotz, Walter, to Medac Gesellschaft fur klinische Spezialpraparate mbH. Chamber and process for crossed immunoelectro-phoresis. 3,964,992, Cl. 204-299.00R.

Krupman, Leonid Isaakovich; Okonishnikov, Ary Mikhailovich; Sochnev, Alexandr Egorovich; Gavronsky, Boris Viktorovich; Popov, Viktor Alexeevich; Kalashnik, Anatoly Nikolaevich; Chumachenko, Vasily Sergeevich; Gudkevich, Veniamin Mikhailovich; Panev, Georgy Alexeevich; Detochka, Vasily Ivanovich; Telesov, Savely Adolfovich; Pokrass, Leonid Moiseevich; Ofengenden, Abram Mikhailovich; Nesterovich, Raisa Petrovna; and Zhitnik, Georgy Gavrilovich. Slag-forming mixture. 3,964,900, Cl. 75-94.000.

Kubota, Takeshi, to Mitsui Shipbuilding and Engineering Co., Ltd. Process for gasification of heavy hydrocarbons. 3,964,881, Cl. 48-214.00A.

Kubota Tekko Kabushiki Kaisha: *See*—
Murayama, Yoshinobu; and Uchibori, Yashunori, 3,964,585.

Kubovich, Frank Steve: *See*—
Bender, David John; and Kubovich, Frank Steve, 3,964,232.

Kucera, Josef: *See*—
Stoy, Artur; Stoy, Vladimir; Urbanova, Renata; Prokop, Jaroslav; and Kucera, Josef, 3,965,227.

Kugelfischer Georg Schafer & Co.: *See*—
Gassner, Hans; and Kress, Manfred, 3,964,324.
Schuster, Friedrich, 3,964,248.

Kuhn, Matthew; and Schumaker, Norman Edwin, to Bell Telephone Laboratories, Incorporated. Method of mounting semiconductor chips. 3,964,157, Cl. 29-591.000.

Kulikova, Vera Mikhailovna: *See*—
Tarasova, Nina Vasilievna; Obolnikova, Elena Abramovna; Gololobov, Alexandr Dmitrievich; Samokhvalov, Gleb Ivanovich; Chepigo, Sergei Vladimirovich; Ivanova, Galina Ivanovna; Imshenetsky, Vladimir Vasilievich; and Kulikova, Vera Mikhailovna, 3,965,130.

Kunigane, Akihiko: *See*—
Asada, Atsushi; Yoshida, Hideo; and Kunigane, Akihiko, 3,965,466.

Kunioka, Kazuo: *See*—
Sakasegawa, Koji; Ohsumi, Atsushi; Saito, Tatsue; Hosaka, Yukio; Kunioka, Kazuo; Yamamoto, Tomio; and Asai, Tadashi, 3,965,360.

Kuntschik, Lawrence F.; and Edwards, Robert S., to Texaco Inc. Catalytic process. 3,965,177, Cl. 260-566.00A.

Kuo, Chan-Hwa; Taub, David; and Wendler, Norman L., to Merck & Co., Inc. Prostaglandin $E_1$ intermediate 3-carboxymethyl-4-methyl-2-1-carboxy-7-(loweralkoxy or aralkoxycarbonyl)-heptyl]-4-hydroxybutyric acid, γ-lactone, and processes of their preparation. 3,965,120, Cl. 260-343.600.

Kuramochi, Shigeaki. Figure with movable trunk, head etc., having driving device and individual operation means. 3,964,205, Cl. 46-120.000.

Kuraray Co., Ltd.: *See*—
Yamauchi, Junnosuke; Okamura, Takayuki; and Minatono, Shobu, 3,965,076.

Kurata, Hirotaka, to Sansui Electric Co., Ltd. Stereo signal demodulator in a four-channel stereo broadcast receiver. 3,965,302, Cl. 179-15.0BT.

Kurdy, George. Dental hygiene device. 3,964,122, Cl. 15-184.000.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See*—
Morita, Tomijiro; Funahashi, Isao; Sugai, Masayoshi; Sasakawa, Atushi; and Takaiwa, Masakazu, 3,965,242.

Kurilkin, Vitaly Vitalievich; and Kusmartsev, Evgeny Vasilievich. Nuclear reactor fuel assembly. 3,964,968, Cl. 176-81.000.

Kuriyama, Yasuhisa: *See*—
Shin, Hiroshi; Sugano, Junichiro; Yoshii, Tadashi; Iwamoto, Kichiro; Kuriyama, Yasuhisa; and Kakuda, Minoru, 3,965,251.

Kurzeja, Ronald, to Pfizer Inc. Protective coating for graphite electrodes. 3,964,924, Cl. 106-286.000.

Kushner, Benjamin: *See*—
Jureit, John Calvin; Leutwyler, Roy; Brodsky, Larry; Kushner, Benjamin; Seipos, Andrew G.; and Castillo, Adolfo, 3,964,663.

Kusiak, Edward H., to United Technologies Corporation. Pitch change mechanism. 3,964,839, Cl. 416-160.000.

Kusmartsev, Evgeny Vasilievich: *See*—
Kurilkin, Vitaly Vitalievich; and Kusmartsev, Evgeny Vasilievich, 3,964,968.

Kusters, Eduard: *See*—
Leifeld, Ferdinand, 3,964,860.

Kuti, Laszlo: *See*—
Johan, Bela; Szemler, Laszlo; Fulop, Janos; Szontagh, Tamas; Simonovits nee Czink, Emilia; Bekes nee Erdos, Judit; Kuti, Laszlo; Toros, Robert; Szekely, Denes; Szabo, Laszlo; Seitz, Karoly; Vajda, Tade; Kovacs nee Komoroczy, Erzsebet; Hargital nee Franyo, Aniko; and Polinszky, Karoly, 3,964,971.

Kutilin, Alexandr Grigorievich: *See*—
Vexelman, Ilya Volfovich; Sljudikov, Leonid Davydovich; Kutilin, Alexandr Grigorievich; and Kalugin, Oleg Mikhailovich, 3,964,303.

L.M. Ericsson Pty. Ltd.: *See*—
Harwood, Keith, 3,965,457.

L. Schuler GmbH: *See*—
Fetzer, Helmut; Braun, Hans; Cieslok, Gunter; and Rasenberger, Otto, 3,964,357.

La Cellophane: *See*—
Robillard, Jean Jules Achille, 3,964,911.

Labadie, Jean Francois; Bernard, Armand R.; de la Taille, Olivier P.; and Thary, Christian, to Etablissements Bertrand Faure. Child's safety chair. 3,964,787, Cl. 297-390.000.

LaBelle, Joan P.; and Ketz, George, Jr., to Kopstein, Joseph Jay by said Joan P. LaBelle and George Ketz, Jr., a part interest. Nail polish bottle retainer. 3,964,709, Cl. 248-133.000.

Lachnit, Friedrich, to Deutsche Babcock & Wilcox Aktiengesellschaft. Continuous filter silo for the cleaning of flue gases. 3,964,889, Cl. 55-429.000.

Lafon, Jean Francois: *See*—
Gourlandt, Albert Joseph; Gourlandt, Georges Charles; Cauquelin, Yves Bernard; and Lafon, Jean Francois, 3,964,481.

Lagonigro, Mauro: *See*—
Husse, Massimo; and Lagonigro, Mauro, 3,964,309.

Lagrange, Donald E.: *See*—
Herold, Stanley J.; Lagrange, Donald E.; and Laswell, John E., 3,964,396.

Lakshmanan, Pallavoor R., to Gulf Research & Development Company. Adhesive composition (case a). 3,965,060, Cl. 260-27.0BB.

Lakshmanan, Pallavoor R.: *See*—
Bash, David L.; and Lakshmanan, Pallavoor R., 3,965,061.

Lamb, Reginald T. Sheet-feeding apparatus. 3,964,740, Cl. 271-11.000.

Lamborn, Homer C.: *See*—
Kao, Paul W.; and Lamborn, Homer C., 3,964,521.
Kao, Paul W.; and Lamborn, Homer C., 3,964,522.

Lampe, Robert F., to United States of America, Energy Research and Development Administration. Molten core retention assembly. 3,964,966, Cl. 176-38.000.

Lampton, Michael L.: *See*—
United States of America, National Aeronautics and Space Administration; Lampton, Michael L.; and Paresce, Francesco, 3,965,354.

Lancz, Albert Jay, to Colgate-Palmolive Company. Germicidal all-purpose liquid cleaner. 3,965,026, Cl. 252-106.000.

Lane, M. Jack: *See*—
Horn, Roy L.; and Lane, M. Jack, 3,964,435.

Lane, Noel W., Jr. Method of making radar reflective buoy. 3,965,234, Cl. 264-275.000.

Lang, Hermann: *See*—
Banauch, Dieter; Brummer, Wolfgang; Ebeling, Wolfgang; Helger, Roland; Hennrich, Norbert; and Lang, Hermann, 3,964,974.

Lange, Hans: *See*—
Tiedemann, Hugo; Sojka, Bernward; Lange, Hans; Rey, Hans-Georg; and Rieckmann, Peter, 3,964,870.

Langenbeck, Peter: *See*—
Ehlscheid, Gunter; Langenbeck, Peter; and Stemmler, Kurt, 3,965,327.

Langensiepen, Gert; and Bruning, Werner, to Alfred Fischbach KG Kunststoff-Spritzgusswerk. Device for dispensing flowable materials. 3,964,641, Cl. 222-82.000.

Langhammer, Hans-Juergen, to Klockner-Werke AG. Method and arrangement for melting charges, particularly for use in the production of steel. 3,964,897, Cl. 75-10.00R.

Lardellier, Alain Marie Joseph, to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation. Device for boosting and bleeding a gas turbine engine. 3,964,257, Cl. 60-226.00R.

Lardennois, Regis; Robert, Michel; Gabillard, Robert; and Rubin, Edouard, to Engins Matra. Anti-collision safety device for a passenger transport system on tracks. 3,964,702, Cl. 246-4.000.

LaRochelle, Ronald W.; and Mitchell, Tyrone D., to General Electric Company. Process for making silarylenesilanediol. 3,965,134, Cl. 260-448.20E.

Lartigue, Donald J.: *See*—
Bialouz, Lorraine R.; Herritt, Ethel R.; Lartigue, Donald J.; and Pitcher, Wayne H., Jr., 3,965,035.

Lask, Helmut: *See*—
Holst, Arno; and Lask, Helmut, 3,965,091.

Laswell, John E.: *See*—
Herold, Stanley J.; Lagrange, Donald E.; and Laswell, John E., 3,964,396.

Latal, John J.: *See*—
Christen, Louis J., Jr.; and Latal, John J., 3,964,373.

Lau, Erwin M., to Black Products Co. Bag filling machine having combined inlet valve and level control. 3,964,650, Cl. 222-450.000.

Laughlin, Loran L. Can spout. 3,964,640, Cl. 222-81.000.

Lauterbach, James H. Combination means for rigidly attaching shoe to a pedal for a foot-driven crank-operated machine. 3,964,343, Cl. 74-594.600.

Lawrence Peska Associates, Inc.: *See*—
Conroy, Andrew, 3,964,710.
Lopez, Victor D., 3,964,686.
Mays, Kittrell W., 3,964,697.
Murphy, Norma M., 3,964,427.
Saethre, Magnus, 3,964,471.
Woodford, Thurman R., 3,964,120.

Lawrenz, Carl F.: *See*—
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Lazariants, Emmanuil Gabrielovich: *See*—
Chaplits, Donat Nikolaevich; Kazakov, Vladimir Pavlovich; Lazariants, Emmanuil Gabrielovich; Chebotaev, Vladimir Filippovich; Balashov, Mikhail Ivanovich; and Serafimov, Leonid Antonovich, 3,965,039.

Leach, Bruce E., to Continental Oil Company. Iron catalyst. 3,965,045, Cl. 252-466.00J.

Lednicer, Daniel, to Upjohn Company, The. 4'-Fluoro-4- [4-(phenyl)-4-alkoxy-cyclo-hexyl]amino butyrophenones and the salts thereof. 3,965,180, Cl. 260-570.5CA.

Lee, William F.; Jeffery, William J.; Pyves, Richard R.; and Isaac, Moshi Y., to General Foods Limited. Method of extracting roasted coffee. 3,965,269, Cl. 426-387.000.
Legras, Roger: *See*—
Mercier, Jean; Gallez, Francis; and Legras, Roger, 3,965,064.
Lehmkuhl, Herbert: *See*—
Eisenbach, Wilhelm; Lehmkuhl, Herbert; and Wilke, Gunther, 3,964,983.
Leifeld, Ferdinand, to Kusters, Eduard. Method for dyeing carpets and the like. 3,964,860, Cl. 8-151.000.
Leighton, Robert B.: *See*—
Shair, Frederick H.; Simmonds, Peter G.; Leighton, Robert B.; and Drivas, Peter J., 3,964,294.
Leimgruber, Willy; and Weigele, Manfred, to Hoffmann-La Roche Inc. Process for producing dialkyl aminoacrylonitrile. 3,965,141, Cl. 260-465.50R.
Leinkram, Charles Z.; Oaks, William D.; Eisele, John A.; and Faraday, Bruce J., to United States of America, Navy. Method of planar mounting of silicon solar cells. 3,964,155, Cl. 29-572.000.
Leistner, Werner: *See*—
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Leland Stanford Junior University, The Board of Trustees of: *See*—
Schulz, Werner P., 3,964,468.
Lemahieu, Raymond Gerard: *See*—
Janssens, Wilhelmus; Claeys, Daniel Alois; Lemahieu, Raymond Gerard; and Dierckx, Jozef Aime, 3,965,282.
Lena, Louis: *See*—
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Lenhard, M. James: *See*—
Clemens, Carl F.; and Lenhard, M. James, 3,965,021.
Lenk, Erich; Bauer, Karl; and Turk, Herbert, to Barmag Barmer Maschinenfabrik Aktiengesellschaft. Yarn transporting apparatus. 3,964,657, Cl. 226-177.000.
Lenk, Erich: *See*—
Schippers, Heinz; Bauer, Karl; Lenk, Erich; Mayer, Manfred; and Busch, Hans Jochen, 3,964,723.
Lennon, Donald J.: *See*—
Cohen, Norman B.; and Lennon, Donald J., 3,964,832.
Lenzinger, Fritz: *See*—
Tutzschky, Rudolf; and Lenzinger, Fritz, 3,964,733.
Leo, Daniel W. Advertising display device. 3,964,190, Cl. 40-39.000.
Leone, Salvatore. Load bearing beam for floors and the like. 3,964,217, Cl. 52-86.000.
Lesh, Robert C.; and Spector, George. Mini caddy. 3,964,642, Cl. 222-142.400.
Leslie, Stewart Thomas, to Synergistics. Slow release pharmaceutical compositions. 3,965,256, Cl. 424-22.000.
Letoffe, Michel: *See*—
Ceyzeriat, Louis; and Letoffe, Michel, 3,965,280.
Leutwyler, Roy: *See*—
Jureit, John Calvin; Leutwyler, Roy; Brodsky, Larry; Kushner, Benjamin; Seipos, Andrew G.; and Castillo, Adolfo, 3,964,663.
Le Van, Jacob J., to Raymond Lee Organization, Inc., The, a part interest. Manually operable blender. 3,964,345, Cl. 74-665.00P.
Lever Brothers Company: *See*—
Alexander, David John, 3,964,649.
Drakoff, Raymond, 3,964,500.
Geist, Robert; and Rudolph, Franz Benedikt, 3,964,910.
Levine, Morris: *See*—
Yurcheshen, Michael; Levine, Morris; and Brane, Ralph M., 3,965,058.
Levine, Morris E., to Wagner Electric Corporation. Signal transmission gate. 3,965,372, Cl. 307-254.000.
Levinson, Edwin B.: *See*—
Joseph, John S.; and Levinson, Edwin B., 3,964,826.
Levinstein, Hyman Joseph; and Sinha, Ashok Kumar, to Bell Telephone Laboratories, Incorporated. Ohmic contacts for group III-V n-type semiconductors. 3,965,279, Cl. 427-89.000.
Levy, Leon B., to Celanese Corporation. Oxidation of olefins. 3,965,166, Cl. 260-533.00N.
Lewis, Cyril John: *See*—
Ray, Neil Hunter; Robinson, William Derek; and Lewis, Cyril John, 3,964,919.
Lewis, Gerald F. Underground conduit holder. 3,964,707, Cl. 248-49.000.
Lewis, John H.: *See*—
Allan, Frank V.; Fenn, John B., Jr.; and Lewis, John H., 3,965,352.
Liebe, Wolfgang; and Leistner, Werner, to Siemens Aktiengesellschaft. Pole coil for electric machines and apparatus. 3,965,378, Cl. 310-65.000.
Lienemann, Darlo E.: *See*—
Norris, A. Lowell; and Lienemann, Darlo E., 3,964,639.
Lilly Industries, Ltd.: *See*—
Harrison, Roger Garrick, 3,965,157.
Limburg, William W.: *See*—
Cressman, Paul J.; Limburg, William W.; and Pilato, Louis A., 3,965,276.
Lin, Burn Jeng, to International Business Machines Corporation. Dynamic magnetic bubble display system. 3,965,299, Cl. 178-7.30D.
Lin, Tenhon. Simple foldable container for food and beverages. 3,964,668, Cl. 229-35.000.
Lindqvist, Jonas Herman, to Hiab-Foco Aktiebolag. Remote-controlled loading hook. 3,964,777, Cl. 294-83.00R.
Lindsey, Fred C. Wind driven mechanical drive. 3,964,426, Cl. 115-3.000.
Lindvall, Sven: *See*—
Dahlberg, Alf-Coran; Hogberg, Karl Gustav; Lindvall, Sven; and Rydh, Thore Oskar Verner, 3,965,133.
Lineberry, Cletue E.: *See*—
Brown, John J.; Milholen, William F.; and Lineberry, Cletue E., 3,964,597.
Link, John T.: *See*—
Schalow, Rudolph D.; and Link, John T., 3,964,677.
Linstromberg, William J., to Whirlpool Corporation. Sensing arm water fill shut off for ice maker. 3,964,269, Cl. 62-137.000.
Lipe-Rollway Corporation: *See*—
Armstrong, Jack W., 3,964,601.
Liquid Carbonic Corporation: *See*—
Dwyer, Thomas A., 3,964,270.
Lissau, Frederic, to Sloan Valve Company. Deoseptic assembly for bedpan rinser. 3,964,108, Cl. 4-7.000.
List, Hans: *See*—
Thien, Gerhard; Fachbach, Heinz; and Greier, Josef, 3,964,449.
Thien, Gerhard; and Fachbach, Heinz, 3,964,462.
List, Helmut; and Fredericks, George, to AVL AG. Multi-wire oxygen electrode and method of manufacturing the same. 3,965,383, Cl. 313-331.000.
Lister, John W., to General Electric Company. Balanced drive horizontal deflection circuitry with centering. 3,965,391, Cl. 315-408.000.
Little, Edwin D.; and Cheema, Zafarullah K., to Allied Chemical Corporation. Hydrogenation of phenol. 3,965,187, Cl. 260-586.00R.
Livigni, Russell Anthony: *See*—
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Lobachev, Anatoly Nikolaevich: *See*—
Vakhidov, Shavkat; Vakhidova, Mokhira Akhadovna; Lobachev, Anatoly Nikolaevich; Melnikov, Oleg Konstantinovich; and Triodina, Nina Sergeevna, 3,964,984.
Lobel, Ester: *See*—
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Lockard, Joseph Larue, to AMP Incorporated. Lighted momentary switch array. 3,965,319, Cl. 200-310.000.
Locke, Edward V., to Avco Corporation. Laser deep cutting process. 3,965,328, Cl. 219-121.0LM.
Lockshaw, John E. Rotary cam internal combustion radial engine. 3,964,450, Cl. 123-55.0AA.
Lofquist, Robert Alden; and Saunders, Peter Reginald, to Allied Chemical Corporation. Alkoxylated aliphatic amines to inhibit ozone fading of dyed polyamides. 3,964,861, Cl. 8-165.000.
Loftus, Peter J.: *See*—
Mitchard, John M.; and Loftus, Peter J., 3,964,953.
Long Enterprises: *See*—
Carlson, James E., 3,965,298.
Lonza Ltd.: *See*—
Siegrist, Walter, 3,964,880.
Lopez, Eugene F.; and Evans, Anthony Charles, to Raychem Corporation. Cohesive sealant articles. 3,965,215, Cl. 260-889.000.
Lopez, Victor D., to Lawrence Peska Associates, Inc., a part interest. Showerhead with secondary liquid dispenser. 3,964,686, Cl. 239-74.000.
Loqvist, Kaj-Ragnar: *See*—
Gustafson, Manfred Wallace; and Loqvist, Kaj-Ragnar, 3,965,364.
L'Oreal: *See*—
Morane, Bruno R.; and Gueret, Jean-Louis H., 3,964,643.
Louis M. Gerson Co., Inc.: *See*—
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LTV Aerospace Corporation: *See*—
Heinzman, Homer W., 3,965,394.
Lu, Sun: *See*—
Jones, Derick; and Lu, Sun, 3,965,030.
Ludder, Rodney E., to Owens-Illinois, Inc. Recessed, rim-locking container closure. 3,964,635, Cl. 220-306.000.
Luebke, Clem J.; Beck, Norman L.; and Daniels, Lowell W., to Broaster Co., The. Deep fryer receptacle cover and operating mechanism therefor. 3,964,637, Cl. 220-314.000.
Lukas, Joachim H.; Baardman, Frank; and Kouwenhoven, Adriaan P., to Shell Oil Company. Preparation of derivatives of cyclobutane and cyclobutene. 3,965,204, Cl. 260-666.00A.
Lummus Company, The: *See*—
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Sze, Morgan C.; and Unger, Harold, 3,965,194.
Lumoprint Zindler KG: *See*—
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Lund, Ordell R. Bracket for engagement with the rung and rail of a ladder for supporting an article. 3,964,711, Cl. 248-210.000.
Lundquist, Carl E.: *See*—
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Lunzer, Leo M.; and Evgen, Allan, to Allee Manufacturing, Inc. Snowmobile ski wear rod. 3,964,561, Cl. 180-5.00R.
Luoma, Richard William: *See*—
Aylsworth, William Kenneth; Gudgel, Willard Leon; and Luoma, Richard William, 3,964,672.
Lynch, Thomas J.: *See*—
Heilman, William J.; and Lynch, Thomas J., 3,965,018.
Lyons, Ronald L.: *See*—
Renner, Mathias; and Lyons, Ronald L., 3,965,340.
Lyst, Harold E.: *See*—
Griffis, Juniper, 3,964,791.
M. Geleijnse & Zoon, Firma: *See*—
Geleijnse, Johannes; and Geleijnse, Machiel, 3,964,222.

Ma, John Y., to Zenith Radio Corporation. Television tuning system with precision substrate switch assembly. 3,965,427, Cl. 325-464.000.

Maccabee, Bruce S.; and Bell, Charles E. Low power infrared laser intrusion systems. 3,965,355, Cl. 250-341.000.

MacMillan Bloedel Limited: *See—*
Stout, Ronald M. T.; and Rogerson, Douglas E., 3,965,056.

MacMurdo, Ronald L. Magnetic game device. 3,964,746, Cl. 273-108.000.

Macovski, Albert. Cross-sectional X-ray emission imaging system. 3,965,353, Cl. 250-336.000.

Macovski, Albert. Cross-sectional imaging system using a polychromatic x-ray source. 3,965,358, Cl. 250-369.000.

MacPherson, Edwin J.: *See—*
Brouwer, Walter G.; MacPherson, Edwin J.; Ames, Ronald B.; and Neidermyer, Robert W., 3,964,896.

Maddock, Robert Brent: *See—*
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Madsen, Fred C. Handle attachment for drinking water bottle. 3,964,126, Cl. 16-114.00R.

Maeda Industries, Ltd.: *See—*
Ozaki, Nobuo, 3,964,330.

Maeda, Kenji: *See—*
Umezawa, Hamao; Maeda, Kenji; Kondo, Shinichi; and Fukatsu, Shunzo, 3,965,089.

Maeno, Shizuo: *See—*
Umio, Suminori; Maeno, Shizuo; Ueda, Ikuo; Sato, Yoshinari; and Matsuo, Masaaki, 3,965,122.

Mageli, Orville Leonard: *See—*
D'Angelo, Antonio Joseph; Mageli, Orville Leonard; and Sheppard, Chester Stephen, 3,965,145.

Magnusson, Lawrence B., to Betz Laboratories, Inc. Process for reducing dissolved inorganic orthophosphates to PPB levels in aqueous systems. 3,965,002, Cl. 210-46.000.

Mahon, Joseph J., to Deltrol Corporation. Percentage timer. 3,965,312, Cl. 200-39.00R.

Mahoney, Lee R., to Ford Motor Company. Method for recovery of methyl methacrylate from mixed polymeric materials. 3,965,149, Cl. 260-486.00R.

Major Watch Case Co., Inc.: *See—*
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Malatesta, Alberto: *See—*
Baldwin, Francis P.; and Malatesta, Alberto, 3,965,213.

Mall, Gunther; and Striegler, Werner, to Pfaff Industriemaschinen GmbH. Device for sewing and cutting-open tucks on cut pieces of garments. 3,964,409, Cl. 112-121.150.

Maltby, Jack: *See—*
Stubbs, Dennis; Maltby, Jack; and Oxlade, Roy Ronald, 3,964,282.

Malz, Russell E., Jr.; Amidon, Roger W.; and Greenfield, Harold, to Uniroyal, Inc. Process for preparing N,N-disubstituted acid hydrazides. 3,965,174, Cl. 260-561.00H.

Mamazza, Dominic P.: *See—*
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Manabe, Osamu; and Kameo, Takashi, to Osaka City. Aromatic compound nitration catalyzed by aromatic sulfonic acid supported on solid carrier. 3,965,200, Cl. 260-645.000.

Manchester, Isaac F., Jr., to FAS/CON Systems, Inc. Wristwatch case. 3,964,250, Cl. 58-88.00R.

Manley, Arthur G., to Eastprint, Inc. Disposable electrode. 3,964,469, Cl. 128-2.10E.

Manning, Harold E.; and Ellis, Michael C., to Petro-Tex Chemical Corporation. Method of metal chromite preparation. 3,965,044, Cl. 252-465.000.

Manning, Robert E.: *See—*
Eberle, Marcel K.; and Manning, Robert E., 3,965,110.

Manoogian, Alex; and Pullen, Eric V., to Masco Corporation of Indiana. Push-pull single handle water faucet valve. 3,964,514, Cl. 137-625.170.

Manriquez, Ralph F., to Singer Company, The. Keyed retainer. 3,964,833, Cl. 403-357.000.

Manzoni, John A.: *See—*
Garwood, William E.; Manzoni, John A.; Whyte, Thaddeus F., Jr.; and Wise, John J., 3,965,205.

MAPA GmbH: *See—*
Kesselring, Lutz, 3,964,489.

Marans, Nelson S., to W. R. Grace & Co. Process for concentrating brine. 3,964,960, Cl. 159-49.000.

Marathon Oil Company: *See—*
Kelly, Joe T., deceased, 3,964,994.
Schroeder, Donald E., Jr.; Plummer, Mark A.; and Roszelle, Wayne O., 3,964,548.

Marcus, Irwin: *See—*
Kintish, Irving L.; and Marcus, Irwin, 3,964,392.

Marfiewicz, Wilhelm, to Emil Korsch Spezialfabrik fur Komprimiermaschinen. Device for producing hollow bodies of thermoplastic material. 3,964,852, Cl. 425-326.00B.

Marheine, Edward A., to GTE Automatic Electric Laboratories Incorporated. Intercept arrangement for key telephone systems. 3,965,304, Cl. 179-18.00B.

Marik, Norman J. Automatic candle-wicking machine. 3,964,858, Cl. 431-288.000.

Mark, Gordon, to RCA Corporation. Method of forming an overlayer including a blocking contact for cadmium selenide photoconductive imaging bodies. 3,964,986, Cl. 204-192.000.

Markiewitz, Kenneth H., to ICI United States Inc. Polyurea-urethane polymers from urea, diamines and aminoalcohols. 3,965,072, Cl. 260-77.50C.

Markl, Georg, to Tekade Felten & Guilleaume Fernmeldeanlagen GmbH. 200 MHz carrier frequency system with sextenary groups. 3,965,300, Cl. 179-15.0FS.

Markusch, Peter; and Dieterich, Dieter, to Bayer Aktiengesellschaft. Composite materials. 3,965,051, Cl. 260-2.5AK.

Marriott Corporation: *See—*
Meyers, Henry W.; and Quinby, John, 3,964,118.

Marsan Manufacturing Company, Inc.: *See—*
Neumeier, Erich, 3,964,485.

Marsh, Dana G., to Xerox Corporation. Method for the preparation of relief printing masters. 3,964,907, Cl. 96-35.000.

Marshall, Albert H.; Oharek, Frank J.; Dillard, John H.; and Entwistle, Robert J., to United States of America, Navy. Universal infantry weapons trainer. 3,964,178, Cl. 35-25.000.

Marshall, Graham: *See—*
Craven, George Frederick; Heeks, John Stuart; and Marshall, Graham, 3,965,446.

Marshall, William E.: *See—*
Stocker, Charles T.; Schara, Robert E.; Marshall, William E.; Hayes, John T., Jr.; and Glicksman, Martin, 3,965,268.

Martin, Fred David: *See—*
Persinski, Leonard J.; Martin, Fred David; and Adams, Sally Lee, 3,964,921.

Martin Marietta Aluminum Inc.: *See—*
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Martin, Tellis Alexander: *See—*
Hamlow, Eugene Emanuel; and Martin, Tellis Alexander, 3,965,167.

Martini, George, to Glamorise Foundations, Inc. Brassiere construction. 3,964,491, Cl. 128-476.000.

Maruko, Morihisa; Oda, Chikao; and Nakashima, Eizi, to Hitachi, Ltd. Continuous reactor for viscous materials. 3,964,874, Cl. 23-285.000.

Marulic, Walter J.: *See—*
Ferris, Ray L.; and Marulic, Walter J., 3,964,766.

Maruyama, Isamu; Nakao, Masaru; Sasajima, Kikuo; Inaba, Shigeho; and Yamamoto, Hisao, to Sumitomo Chemical Company, Limited. 3-Phenoxypropylamine derivatives. 3,965,106, Cl. 260-293.830.

Marx, Michael, to Syntex (U.S.A.) Inc. Tricyclic pharmacological agents, intermediates and methods of making. 3,965,181, Cl. 260-570.8TC.

Maschinenfabrik Augsburg-Nurnberg AG: *See—*
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Masco Corporation of Indiana: *See—*
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Mashuda, David. Mechanized wheelchair. 3,964,786, Cl. 297-330.000.

Massachusetts Institute of Technology: *See—*
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Massaro, Anthony J.: *See—*
Junker, Arnold E.; and Massaro, Anthony J., 3,964,753.

Massey-Ferguson Inc.: *See—*
Joslyn, Gerald L.; and Bingley, George W., 3,964,713.

Massey-Ferguson Services N.V.: *See—*
Crawford, Alexander; and Bailey, Alfred J., 3,964,714.

Mast, Aquila D., to Sperry Rand Corporation. Apparatus for feeding materials into a hammermill or the like. 3,964,720, Cl. 241-186.00A.

Matchett, Robert R. Hair grooming apparatus. 3,964,501, Cl. 132-11.00A.

Materials Technology Corporation: *See—*
Post, Robert C.; McCullough, Allen W.; and McClure, James H., 3,964,937.

Mathes, Stanley, to Syntex Puerto Rico, Inc. Inhalation device. 3,964,483, Cl. 128-266.000.

Mathieu, Thomas A. Method of removing material from a bed of a body of water. 3,964,184, Cl. 37-195.000.

Mathues, Thomas P., to General Motors Corporation. Modular proportioner. 3,964,795, Cl. 303-6.00C.

Matlock, Robert G.: *See—*
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Matsieshita Electric Industrial Co., Ltd.: *See—*
Sakamoto, Naraji; Mitsui, Tatsuo; and Hayakawa, Toshio, 3,965,479.

Matsui, Takahiro; and Uwamori, Osamu, to Kabushiki Kaisha Morita Seisakusho. Dental chair. 3,964,725, Cl. 248-421.000.

Matsukawa, Hiroharu; and Saeki, Keiso, to Fuji Photo Film Co., Ltd. Process for the production of oil-containing microcapsules. 3,965,033, Cl. 252-316.000.

Matsuo, Masaaki: *See—*
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Matsushita Electric Industrial Co., Ltd.: *See—*
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Mattco, Inc.: *See—*
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Matthias, Guenther: *See—*
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Matz, Bjorn J.; and Rivers, Paul F., to Dictaphone Corporation. Central dictation system. 3,965,484, Cl. 360-61.000.

Matzuk, Terrance. Integrated ultrasonic scanning apparatus. 3,964,296, Cl. 73-67.50R.

Maxwell, James C., to Carter's Ink Company, The. Method and apparatus for high speed non-impact printing with shade-of-grey control. 3,964,388, Cl. 101-426.000.

May, Edward T., to ACF Industries, Incorporated. By-pass valve with pressure relief feature. 3,964,515, Cl. 137-625.270.

May, Kenneth D.; Dodson, Elmer E.; and Cohee, Claude C., to Qonaar Corporation. Parking meter with automatic reading means. 3,964,590, Cl. 194-83.000.

May, Kenneth Peter: *See—*
Denenberg, Jeffrey Neil; and May, Kenneth Peter, 3,965,432.

Mayer, Manfred: *See—*
Schippers, Heinz; Bauer, Karl; Lenk, Erich; Mayer, Manfred; and Busch, Hans Jochen, 3,964,723.

Mays, Kittrell W., to Lawrence Peska Associates, Inc., a part interest. Deployable wing back pack. 3,964,697, Cl. 244-64.000.

McAleer, William J.; Posch, Kenneth L.; Baugh, Clarence L.; and Spier, Raymond E., to Merck & Co., Inc. Process for production of vaccines. 3,965,258, Cl. 424-89.000.

McArthur, John N.; Dawkins, Peter D.; and Smith, Mervyn J. H., to McArthur, John N. Anti-inflammatory dipeptide. 3,965,260, Cl. 424-177.000.

McAvoy, Dennis J., to Sperry Rand Corporation. Power transmission. 3,964,505, Cl. 137-106.000.

McCabe, John H., to Fox Specialty Co., Inc. Combined decanter and tray. 3,964,629, Cl. 220-23.860.

McCartan, Daniel A.: *See—*
Miller, Ward B.; and McCartan, Daniel A., 3,964,235.

McClelland, Euan, to Imperial Chemical Industries Limited. Polyester catalysts. 3,965,071, Cl. 260-75.00R.

McClelland, Robert G., to E. H. Sheldon and Company. Tension rod cabinet systems. 3,964,811, Cl. 312-265.000.

McClure, James H.: *See—*
Post, Robert C.; McCullough, Allen W.; and McClure, James H., 3,964,937.

McCorkle, Alfred S.; and Hoar, Charles L. Wood processing unit for reducing air pollution. 3,964,716, Cl. 241-28.000.

McCrosky, Warren N.; and Peterschmidt, Dennis F., to General Electric Company. Rotor having balance weights. 3,965,382, Cl. 310-261.000.

McCulloch Corporation: *See—*
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McCullough, Allen W.: *See—*
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McDonnell Douglas Corporation: *See—*
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McDonough, Cletus, to Molex Incorporated. Insulation piercing terminal. 3,964,815, Cl. 339-97.00C.

McGill Manufacturing Company, Inc.: *See—*
Olson, Harry William, 3,965,316.

McGill, Paul F. Fire sprinkler and ceiling panel assembly. 3,964,549, Cl. 169-37.000.

McGinty, Otto Wayne. Low coolant level protection system. 3,964,567, Cl. 180-103.00R.

McHugh, Daniel J.: *See—*
Irani, Cyrus A.; and McHugh, Daniel J., 3,965,001.

McIntosh Laboratory, Inc.: *See—*
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Fish, Lawrence W., Jr.; Evans, Ronald C.; and Corderman, Sidney A., 3,965,423.
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McKay, Charles Raymond: *See—*
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McKinley, Francis W. Container and dispenser for fish bait. 3,964,204, Cl. 43-55.000.

McKirnan, Robert A.: *See—*
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McLean, James N.: *See—*
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McLeod, Wilfred R.: *See—*
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McNerney, Richard P.: *See—*
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Mead Johnson & Company: *See—*
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Measurex Corporation: *See—*
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Medac Gesellschaft fur klinische Spezialpraparate mbH: *See—*
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Medlock, Leslie Ernest, to Imperial Chemical Industries Limited. Bursting disc assembly. 3,964,390, Cl. 102-1.00R.

Medtronic, Inc.: *See—*
Nelms, George E., 3,964,490.
Trombley, Michael A., 3,964,470.

Mei, Kenyon Chi-Yen, to Hewlett-Packard Company. Multiple output logic circuits. 3,965,367, Cl. 307-207.000.

Meier, Werner: *See—*
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Meister, Otto: *See—*
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Melnikov, Oleg Konstantinovich: *See—*
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Mendoza, Rudolph R.: *See—*
Gearhart, Marvin; King, David W.; Mendoza, Rudolph R.; Scherbatskoy, Serge A.; and Young, James D., 3,964,556.

Mercier, Jean; Gallez, Francis; and Legras, Roger, to Unibra S.A. Process for the crystallization of polycarbonates and products obtained. 3,965,064, Cl. 260-30.60R.

Merck & Co., Inc.: *See—*
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Mercury Metal Products, Inc.: *See—*
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Merkle, Otto: *See—*
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Merrick, Richard H., to Arkla Industries, Inc. Compact absorption refrigeration apparatus. 3,964,273, Cl. 62-476.000.

Metaframe Corporation: *See—*
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Metawerke KG Closs, Rauch & Schnizler: *See—*
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Metzger, Arthur C.; and Hadden, William, to United States of America, Army. Aerial acoustic target seeker. 3,964,694, Cl. 244-3.150.

Metzger, Jacques: *See—*
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Metzger, Julio, to E. R. Squibb & Sons, Inc. Amphotericin complexes. 3,965,090, Cl. 260-210.0AB.

Meusel, Otto; and Dressel, Otto, to Siemens Aktiengesellschaft. Apparatus for a rotating thyristor excitation. 3,965,379, Cl. 310-68.00R.

Meyer, Charles H.; Sheffield, Donald H.; and Willman, George N., to Mobil Oil Corporation. Apparatus for securing a sheet of material into a roll. 3,964,380, Cl. 100-9.000.

Meyers, Charles K.: *See—*
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Meyers, Henry W.; and Quinby, John, to Marriott Corporation. Cargo transfer vehicle with double angle catwalk adjustment. 3,964,118, Cl. 14-72.500.

Meyers, Robert A., to TRW Inc. Synthesis of certain bis(phthalic anhydrides). 3,965,125, Cl. 260-346.300.

Michigan Chemical Corporation: *See—*
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Mickus, Frank, to Borg-Warner Corporation. One piece stamped pulley. 3,964,326, Cl. 74-230.050.

Middleton, William J., to Du Pont de Nemours, E. I., and Company. Homopolymers of polyfluorinated vinyl isocyanates. 3,965,074, Cl. 260-77.50R.

Midwest-Precision Corporation: *See—*
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Mikule, Jiri; and Schneider, Hans Georg, to Industrial Filter & Pump Mfg. Co. Method for operating ion exchange columns. 3,965,000, Cl. 210-24.000.

Mikuni Kogyo Kabushiki Kaisha: *See—*
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Miles, Thomas E. Weft knit fabric with deflected inlaid yarn. 3,964,277, Cl. 66-190.000.

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Miller, Galen R., to Chemidyne Corporation. Safety cap assembly for pressurized vessels. 3,964,508, Cl. 137-377.000.

Miller, Gerald K., to Nartron Corporation. Intermittent load energizer assembly and circuit means. 3,965,398, Cl. 317-141.00S.

Miller Ralph L., to Bell Telephone Laboratories, Incorporated. Signaling system. 3,965,296, Cl. 179-1.50R.

Miller, Roy W.; and Gutridge, Jack E., to Pullman Incorporated. Railway gondola car. 3,964,399, Cl. 105-406.00R.

Miller, Ward B.; and McCartan, Daniel A., to Owens-Corning Fiberglas Corporation. Roll-up compressive packaging apparatus. 3,964,235, Cl. 53-118.000.

Milner, Edward Francis Godfrey: *See—*
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Minkow, Julius M. Apparatus for assembling a frame. 3,964,288, Cl. 72-306.000.
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Viker, Harris W.; and Kropp, William E., 3,964,415.
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Mitchell, Roland J., to Wallace-Murray Corporation. Fan drive hydraulic coupling. 3,964,582, Cl. 192-58.00B.
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Moertel, George B., to Textron, Inc. Method for making slide fasteners. 3,964,150, Cl. 29-408.000.
Mogle, Douglas H., to United States of America, Navy. Headrest proportional control for motorized wheelchair. 3,965,402, Cl. 318-55.000.
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Monger, Raymond Frederick. Analog-to-digital converters. 3,965,467, Cl. 340-347.0NT.
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Morane, Bruno R.; and Gueret, Jean-Louis H., to L'Oreal. Unpressurized container for holding a plurality of products separately and dispensing them simultaneously. 3,964,643, Cl. 222-145.000.
Morduchowitz, Abraham, to Texaco Inc. Method of bonding utilizing imide ester derivatives of ethene maleic anhydride copolymers. 3,964,954, Cl. 156-331.000.
Morgan, Brian E.: *See*—
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Mori, Fumiko, to Matsushita Electric Industrial Co., Ltd. Cooking time adjusting arrangement for use in electronic oven. 3,965,324, Cl. 219-10.55B.
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Morita, Tomijiro; Funahashi, Isao; Sugai, Masuyoshi; Sasakawa, Atushi; and Takaiwa, Masakazu, to Kureha Kagaku Kogyo Kabushiki Kaisha. Method for desulfurizing exhaust gas by alkali sulphite-gypsum process. 3,965,242, Cl. 423-166.000.
Moritomo, Sadao, to Seiko Seiki Kabushiki Kaisha. Grinding apparatus. 3,964,210, Cl. 51-165.710.
Morrow, Raymond A. Silencer for combustion engines. 3,964,570, Cl. 181-56.000.
Mort, Paul R., Jr.; and Cleary, Robert A., to Synchro-Motion Corporation. Bottom labeling method and apparatus. 3,964,947, Cl. 156-64.000.
Mory, Walter. Ski binding. 3,964,756, Cl. 280-614.000.
Moser, Rabin; and Weiler, Ernest A., to Xerox Corporation. Dual mode roll fuser. 3,965,331, Cl. 219-216.000.
Motorola, Inc.: *See*—
Barbara, Bruce J., 3,965,460.
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Mount, Bruce E.; and Barela, James R., to City of Hope-A National Medical Center. Apparatus and method for measuring heart condition. 3,965,339, Cl. 235-151.300.
Moynihan, John D.: *See*—
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Mueller, Floyd F.; and Gelbuda, William A., to American Hospital Supply Corporation. Shelf and corner post assembly. 3,964,404, Cl. 108-144.000.
Mulhollam, Gail R.: *See*—
Clinard, Glenn G.; Guth, Kenneth C.; Mulhollam, Gail R.; and Volk, Frank J., 3,965,470.
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Munis, Richard H. Coin photographic apparatus. 3,964,829, Cl. 355-75.000.

Murai, Masayo; and Monno, Hiroki, to Nishiyama Gomu Kabushiki Kaisha. Device for sealing the end of sheath pipe. 3,964,754, Cl. 277-101.000.

Murayama, Yoshinobu; and Uchibori, Yashunori, to Kubota Tekko Kabushiki Kaisha. Hydraulic double clutch of the wet type with pressure control valves. 3,964,585, Cl. 192-87.130.

Murphy, Daniel Joseph: *See—*
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Murphy, Norma M., to Lawrence Peska Associates, Inc., a part interest. Survival apparatus. 3,964,427, Cl. 116-124.00B.

Murphy, Thomas V. Modular shelf and cabinet system. 3,964,810, Cl. 312-257.00R.

Murray, Hans Edward Henrik, to SKF Nova AB. Process for batch production of sponge iron. 3,964,898, Cl. 75-11.000.

Murray, Wayne Henry: *See—*
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Murtaugh, Justin J., to Drackett Company, The. Soap curd dissolving drain cleaner. 3,965,048, Cl. 252-527.000.

Musgrave, Daniel D. Adjustable spring assembly. 3,964,199, Cl. 42-50.000.

Mutschler, Erich; and Weber, Adam, to SWF-Spezialfabrik fur Autozubehor Gustav Rau GmbH. Return device for a direction indicating switch. 3,965,313, Cl. 200-61.270.

Mycka, Anthony, Jr.: *See—*
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Myers, Albert F., Sr., to Aspro, Incorporated. Limited slip differential including conical pinion and side gears. 3,964,346, Cl. 74-711.000.

Mynol, Inc.: *See—*
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Nagata, Yasunori; Itoh, Hirotaka; Yazaki, Susumu; Hamamura, Takayuki; and Yoshiya, Shigeo, to Kanebo, Ltd. Apparatus for continuously washing a yarn with a washing liquid. 3,964,279, Cl. 68-205.00R.

Naidu, Panjeti Babu. Snow protectors for windshields. 3,964,780, Cl. 296-95.00C.

Naik, Navnitrai Nagirji: *See—*
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Nakamura, Norihiko; and Baika, Toyokazu, to Toyota Jidosha Kogyo Kabushiki Kaisha. High compression internal combustion engine using a lean charge. 3,964,452, Cl. 123-78.0AA.

Nakamura, Shigeji, to Nippon Electric Glass Company, Limited. Objects of marble-like glass ceramic. 3,964,917, Cl. 106-39.600.

Nakane, Yoshihiko: *See—*
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Nakanishi, Michio; Araki, Kazuhiko; Tahara, Tetsuya; and Shiroki, Masami, to Yoshitomi Pharmaceutical Industries, Ltd. Triazolothienodiazepine compounds. 3,965,111, Cl. 260-308.00C.

Nakano, Soichi; Iizuka, Yoshitoku; and Watanabe, Masao. Heating of intake mixture for auxiliary chamber of internal combustion engine. 3,964,460, Cl. 123-191.00S.

Nakao Filter Media Corporation: *See—*
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Nakao, Masaru: *See—*
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Nakao, Yosinori, to Nakao Filter Media Corporation. Method for filtering and cleaning a filter bag. 3,964,883, Cl. 55-96.000.

Nakashima, Eizi: *See—*
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Nakata, Tetsuya: *See—*
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Namiki, Isamu: *See—*
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Namiki, Ryoichi, to Ricoh Co., Ltd. Device for supplying an offset preventing liquid to a fixing roller. 3,964,431, Cl. 118-60.000.

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National Steel Corporation: *See—*
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Navelsaker, Olav Rasmusson, to Thune-Eureka A/S. Method of pumping liquid with a submerged rotary pump and pump for carrying out the method. 3,964,836, Cl. 415-1.000.

Neidermyer, Robert W.: *See—*
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Nelms, George E., to Medtronic, Inc. Lead storage apparatus for electromedical device. 3,964,490, Cl. 128-419.00R.

Nelson, Ira V., to United States of America, Energy Research and Development Administration. Tag gas capsule with magnetic piercing device. 3,964,967, Cl. 176-80.000.

Nesterovich, Raisa Petrovna: *See—*
Krupman, Leonid Isaakovich; Okonishnikov, Ary Mikhailovich; Sochnev, Alexandr Egorovich; Gavronsky, Boris Viktorovich; Popov, Viktor Alexeevich; Kalashnik, Anatoly Nikolaevich; Chumachenko, Vasily Sergeevich; Gudkevich, Veniamin Mikhailovich; Panev, Georgy Alexeevich; Detochka, Vasily Ivanovich; Telesov, Savely Adolfovich; Pokrass, Leonid Moiseevich; Ofengenden, Abram Mikhailovich; Nesterovich, Raisa Petrovna; and Zhitnik, Georgy Gavrilovich, 3,964,900.

Neumann, Gerhard, to General Electric Company. Gas turbine engine noise shield. 3,964,568, Cl. 181-33.0HA.

Neumann, Gerhard, to General Electric Company. Gas turbine engine noise shield. 3,964,569, Cl. 181-33.0HA.

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Newtson, Gary L. Grocery cart clip attachment. 3,964,134, Cl. 24-81.0PC.

Ng, John; and Jacobs, Melvin A., to GTE Automatic Electric Laboratories Incorporated. Arrangement for increasing the call handling capabilities of a crosspoint tandem system. 3,965,305, Cl. 179-18.0EB.

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Nicolaisen, Bernard H., to Olin Corporation. Method for preparing alkali metal orthophosphates and ammonia in a single step. 3,965,245, Cl. 423-312.000.

Nicollet, Michel. Automatic device for subaqueous massage. 3,964,472, Cl. 128-66.000.

Nighy, Charles David. Stainless steel polish. 3,964,913, Cl. 106-10.000.

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Nippon Electric Glass Company, Limited: *See—*
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Nishida, Toyomi; Sohma, Hiroshi; and Ito, Hayami, to Kawasaki Jukogyo Kabushiki Kaisha. Process for calcination of cement-clinker. 3,964,922, Cl. 106-100.000.
Nishimiya, Torazo, to Hitachi, Ltd. Differential ignition timing firing control system. 3,964,454, Cl. 123-148.0DS.
Nishimura, Yoshitaka: *See*—
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Nishio, Osamu; and Adachi, Nokihisa, to Okuma Machinery Works, Ltd. Knitting error detecting apparatus for circular knitting machine. 3,964,276, Cl. 66-154.00A.
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Nojiri, Naohiro: *See*—
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Nonaka, Tsutomu. Reference indexing device. 3,964,192, Cl. 40-104.010.
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Normandin, Michel. Vane-type rotary internal combustion engine. 3,964,447, Cl. 123-8.410.
Norris, A. Lowell; and Lienemann, Darlo E., to International Harvester Company. Seed tube diffuser for a pneumatic seed planter. 3,964,639, Cl. 221-278.000.
Norsk Hydro A.S.: *See*—
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Ogden, John M. Tennis racquet stringing calibrator. 3,964,291, Cl. 73-1.00B.
Ogg, Andrew L. Spring mounted pitching deck and projectile for impacting thereon. 3,964,745, Cl. 273-95.00R.
O'Hanlon, Edward J. Solar air conditioner. 3,964,678, Cl. 237-1.00A.
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Olstowski, Franciszek; and Parrish, Donald B., to Dow Chemical Company, The. Preparation of rapid setting non-elastomeric polyurethane compositions in the presence of ester-modified polyoxyalkylene compounds. 3,965,073, Cl. 260-77.5AN.
Oltman, John E.; and Feldhake, Ralph H., to ESB Incorporated. Battery having deformations in a metal layer. 3,964,932, Cl. 136-111.000.
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Ott, Norman D.; and Foster, Richard D. Bowling ball hole font. 3,964,726, Cl. 249-90.000.

Otte, George, Jr., to American Sterilizer Company. Liquid waste disposal. 3,965,006, Cl. 210-138.000.

Ou, Wen-Pin, to Motorola, Inc. Microstrip or stripline coupled-transmission-line impedance transformer. 3,965,445, Cl. 333-33.000.

Ounsted, Edwin J.: *See*—
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Owen, Walter L. Clamp. 3,964,738, Cl. 269-221.000.

Owens-Corning Fiberglas Corporation: *See*—
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Owens-Illinois, Inc.: *See*—
Ludder, Rodney E., 3,964,635.

Owens, Malcolm P.; Barnes, Edgar E.; and Burton, Dennis Ray, to Fiber Industries, Inc. Apparatus for forming a transfer tail. 3,964,721, Cl. 242-18.0PW.

Oxlade, Roy Ronald: *See*—
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Oxy-Catalyst, Incorporated: *See*—
Smithson, Harold; and Stahl, John F., 3,964,528.

Ozaki, Nobuo, to Maeda Industries, Ltd. Chain guide connector device for use in bicycle derailleurs. 3,964,330, Cl. 74-240.000.

Ozero, Brian I., to Halcon International, Inc. Process for the recovery of ethylene oxide. 3,964,980, Cl. 203-42.000.

P. R. Mallory & Co., Inc.: *See*—
Butler, Steven J.; Clawson, Arthur Harley, Jr.; and Ward, Robert Jackie, 3,964,664.
Puerner, George O., 3,965,454.

Packard, Martin E.; Ullman, Edwin F.; and Burkoth, Terry L., to Syva Company. Carbanilate compound for erythemal protection. 3,965,144, Cl. 260-471.00C.

Packer, Paul R. Urine conducting apparatus. 3,964,111, Cl. 4-110.000.

Paduch, Stanley Raymond; and Hansen, Kenneth Peter, to United Technologies Corporation. Fuel enrichment and hot start control apparatus in a fuel control. 3,964,253, Cl. 60-39.140.

Paige, Bernice E., to United States of America, Energy Research and Development Administration. Dissolution process for $ZrO_2$-$UO_2$-CaO fuels. 3,965,237, Cl. 423-4.000.

Paiva, Micheal O., to McIntosh Laboratory Inc. Cathode ray tube meters. 3,965,419, Cl. 324-121.00R.

Palleni, Roberto. Respiration system and device. 3,964,476, Cl. 128-145.600.

Palosi, Eva: *See*—
Toth, Edit; Torley, Jozsef; Gorog, Sandor; Szporny, Laszlo; Palosi, Eva; and Szeberenyi, Szabolcz, 3,965,179.

Panev, Georgy Alexeevich: *See*—
Krupman, Leonid Isaakovich; Okonishnikov, Ary Mikhailovich; Sochnev, Alexandr Egorovich; Gavronsky, Boris Viktorovich; Popov, Viktor Alexeevich; Kalashnik, Anatoly Nikolaevich; Chumachenko, Vasily Sergeevich; Gudkevich, Veniamin Mikhailovich; Panev, Georgy Alexeevich; Detochka, Vasily Ivanovich; Telesov, Savely Adolfovich; Pokrass, Leonid Moiseevich; Ofengenden, Abram Mikhailovich; Nesterovich, Raisa Petrovna; and Zhitnik, Georgy Gavrilovich, 3,964,900.

Panis, Constantius Johannes Waltherus: *See*—
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Panzarino, Joseph N.: *See*—
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Pappo, Raphael: *See*—
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Paramythioti, Michel; De La Sayette, Emmanuel R.; and Girard, Jacques J., to Albaret S.A. Apparatus for compacting or consolidating a freshly surface strip. 3,964,834, Cl. 404-84.000.

Pardington, Lawrence D., to Teleflex Incorporated. Motion transmitting remote control assembly. 3,964,337, Cl. 74-501.00P.

Paresce, Francesco: *See*—
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Parker-Hannifin Corporation: *See*—
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Parker, Thomas E.: *See*—
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Parolin, John J., to Cole-Hersee Company. Responsive to movement in first and second opposed directions for establishing first and second different interconnections. 3,965,311, Cl. 200-16.00C.

Parr, Edward L. Power generating machine actuated by ocean swells. 3,965,365, Cl. 290-53.000.

Parrish, Donald B.: *See*—
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Parrish, Kemp L. Smoke generator. 3,964,304, Cl. 73-147.000.

Parsons, Ward H. Vehicle loading apparatus and method. 3,964,620, Cl. 214-41.00R.

Partridge, Arnold Brown; and Woerner, Joseph Frank. Waste disposal apparatus. 3,964,406, Cl. 110-8.00A.

Pastor, Raphael: *See*—
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Pate, Thomas, Jr.: *See*—
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Patterson, Leslie A. Locking trigger guard. 3,964,200, Cl. 42-70.00E.

Patton, John Tinsman. Modified heteropolysaccharides. 3,964,972, Cl. 195-31.00P.

Patton, Jon R., to Clark Equipment Company. Hydrostatic transmission control system. 3,964,262, Cl. 60-447.000.

Payne, Bernard M.: *See*—
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Pearce, Larry N.; and Sanders, Grady H., to Deering Milliken Research Corporation. Method and apparatus to treat yarn. 3,964,691, Cl. 242-47.000.

Pearsall, George David, Jr., to Bell Telephone Laboratories, Incorporated. Means for preventing an electrical shock hazard. 3,965,397, Cl. 317-116.000.

Peck, Charles G.: *See*—
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Pendleton, Earl M., to Mattco, Inc. Winch spool with disc brake system. 3,964,692, Cl. 242-54.00R.

Pennwalt Corporation: *See*—
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Perkins, David: *See*—
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Pernicka, Henry A.; and Moore, R. Dale, to International Harvester Company. Interlocking welded construction for roll over protective structures. 3,964,782, Cl. 296-102.000.

Perrella, Emilio. Dispensing container assembly. 3,964,609, Cl. 206-540.000.

Perry, Clark William; and Teitel, Sidney, to Hoffmann-La Roche Inc. Salts of the γ-lactone of (-)-threo-hydroxycitric acid with R(+)-α-methyl-p-nitrobenzylamine. 3,965,121, Cl. 260-343.600.

Perry, Clark William; and Teitel, Sidney, to Hoffmann-La Roche Inc. Optical resolution of organic carboxylic acids. 3,965,129, Cl. 260-348.00A.

Persinski, Leonard J.; Martin, Fred David; and Adams, Sally Lee, to Calgon Corporation. Well cementing composition having improved flow properties, containing phosphonobutane tricarboxylic acid, and method of use. 3,964,921, Cl. 106-90.000.

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Peters, Edwin F.: *See*—
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Peterschmidt, Dennis F.: *See*—
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Petersen, Paul S., to Cordem Corporation. Apparatus and method of braking a universal motor for operating a compact winch. 3,965,404, Cl. 318-261.000.

Peterson, Francis C., to C. Hager & Sons Hinge Manufacturing Company. Pivot arrangement for transferring pressurized air into a pivot door. 3,964,207, Cl. 49-388.000.

Peterson, John O. H., to Scott Paper Company. Printing plate by laser transfer. 3,964,389, Cl. 101-467.000.

Peterson, Richard C.; Moynihan, John D.; and O'Shea, Martin W., to Sprague Electric Company. Electromagnetic radiation source locator. 3,965,425, Cl. 325-364.000.

Peterson, Weldon Herbert: *See*—
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Petigara, Ramesh B.: *See*—
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Petrides, Petros T.; Nickerson, Russell J.; Cordeiro, Rodney R.; and Dodson, James S., Jr. Electrical system for automatic arc welding. 3,965,329, Cl. 219-124.000.

Petro-Tex Chemical Corporation: *See*—
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Petrolite Corporation: *See—*
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Pettersson, Henry A. Device for a combined suction and blow-off nozzle connectable to a source of compressed air. 3,964,123, Cl. 15-345.000.

Pettersson, Leif B., to AB Ziristor. Arrangement for the stacking in a space-saving manner of tetrahedral packing units in a prismatic collective container. 3,964,617, Cl. 214-10.50R.

Pettrey, James Oliver, Jr.; and Davis, Rufus Furman, Jr., to Allied Chemical Corporation. Process for cleaning coke oven gas offtakes. 3,964,976, Cl. 201-2.000.

Pfaff Industriemaschinen GmbH: *See—*
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Pfister, Jurg R.; Harrison, Ian T.; and Fried, John H., to Syntex (U.S.A.) Inc. Disubstituted xanthone carboxylic acid compounds. 3,965,115, Cl. 260-335.000.

Pfizer Inc.: *See—*
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Phillips, Clyde G. Refrigeration charging cylinder. 3,964,267, Cl. 62-51.000.

Phillips, Ernest C., Jr.: *See—*
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Pitner, Alfred, to Nadella, a part interest. Bearing for rectilinear motion. 3,964,802, Cl. 308-6.00C.

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Pittarelli, James A., to Driver's Agency Ltd.; and Pittarelli, James A. System for training motorcycle operators. 3,964,564, Cl. 180-33.00R.

Pizzeck, Donald E., to United States of America, National Aeronautics and Space Administration. Connector. 3,964,813, Cl. 339-17.00M.

Place, Virgil A.: *See—*
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Plantif, Bernard E.; Doin, Bernard J.; and Beaumont, Jean S., to Societe Nationale des Poudres et Explosifs. Production of non-toxic gas by combustion of solid propellant. 3,964,256, Cl. 60-219.000.

Platek, Stanley F. Adjustable jar cap rotator including in combination can perforator and bottle opener. 3,964,115, Cl. 7-14.250.

Platner, Warren; Ursul, Earl G.; Kolk, Stephen B.; and Whitwam, Ronald L., to Steelcase, Inc. Chair. 3,964,789, Cl. 297-445.000.

Playground Corporation of America: *See—*
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Plessers, Hendrik Sylvester: *See—*
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Plowman, Richard E., to Dentsply Research & Development Corporation. Dental cuspidor with fluid recirculation system. 3,964,112, Cl. 4-262.000.

Plumadore, John D., to Scott Paper Company. Electrophotographic development apparatus. 3,964,436, Cl. 118-637.000.

Plume, Robert W., to Travel Products, Inc. Reversible seat and bed apparatus. 3,964,785, Cl. 297-64.000.

Plummer, Mark A.: *See—*
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Poe, L. Richard, to Hartwell Corporation. Initially single piece rotatable fastener. 3,964,364, Cl. 85-72.000.

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Pokrass, Leonid Moiseevich: *See—*
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Post, Robert C.; McCullough, Allen W.; and McClure, James H., to Materials Technology Corporation. Method of making a composite coating. 3,964,937, Cl. 148-6.350.

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Prenntzell, Kurt. Flexible compartmented package. 3,964,604, Cl. 206-219.000.

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Priola, Aldo; Cesca, Sebastiano; and Ferraris, Giuseppe, to Snam Progetti S.p.A. Procedure for the production of polymers and copolymers of isobutylene. 3,965,078, Cl. 526-154.000.

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Redmer, Wilbert; Rolin, Kenneth; and Nittel, Herman, to Abbott Laboratories. Continuous automated plastic injection molding apparatus for making syringes having a covering sheath. 3,964,857, Cl. 425-515.000.

Redmond, John D., Jr., to Gates Rubber Company, The. Elastomer-free fabric surface for power transmission belt tooth facing. 3,964,328, Cl. 74-231.00C.

Redmore, Derek, to Petrolite Corporation. Process for controlling microbiological organisms in aqueous or petroleum hydrocarbon systems. 3,965,264, Cl. 424-200.000.

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Rehrig, Houston. Box for encasing a bag containing liquid. 3,964,636, Cl. 220-306.000.

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Reinisch, Ronald F.; Gloria, Hermilo R.; Goldsberry, Ronald E.; and Adamson, Michael J., to United States of America, National Aeronautics and Space Administration. Ultraviolet and thermally stable polymer compositions. 3,965,096, Cl. 260-240.00G.

Reiser, Carl A., to United Technologies Corporation. Fuel cell cooling system. 3,964,930, Cl. 136-86.00R.

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Renner, Hermann; and Weidemann, Dieter, to Daimler-Benz Aktiengesellschaft. Door for vehicle, especially passenger motor vehicle. 3,964,208, Cl. 49-502.000.

Renner, Mathias; and Lyons, Ronald L. Optical counting device. 3,965,340, Cl. 235-151.320.

Renold Limited: *See—*
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Renz, Gunter; Wehr, Walter; and Amann, Bertram, to Goltermann, Wandel U. Method of and apparatus for testing transmission line carrying bipolar PCM signals. 3,965,294, Cl. 178-69.00A.

Reppert, Merlyn R.; and Beckwith, Thomas M., to W. R. Grace & Co. Electroplating apparatus. 3,964,987, Cl. 204-194.000.

Reser, G. Louis, to Sybron Corporation. X-ray film loader. 3,965,361, Cl. 250-468.000.

Revue Thommen AG: *See—*
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Rexnord Inc.: *See—*
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Reynolds, Donald F. Hitch assemblies. 3,964,768, Cl. 280-495.000.

Reynolds, Gordon S.; and Hansen, A. Boyd, to Sorenson Research Co., Inc. Antiocoagulant metering device and method. 3,964,484, Cl. 128-276.000.

Rheinmetall G.m.b.H.: *See—*
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Rhone-Poulenc S.A.: *See—*
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Ricci, Vincent C.; and Spandorfer, Lester M., to Sperry Rand Corporation. Programable data entry system. 3,965,335, Cl. 235-61.90R.

Rich, Beldon R., to Parker-Hannifin Corporation. Cushioning means for hydraulic cylinder. 3,964,370, Cl. 91-395.000.

Richardson, Gregory R., administrator: *See—*
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Rickardsson, Erik Georg. Air spring axle assembly for spring suspension and sway restraining of vehicle chassis. 3,964,764, Cl. 280-702.000.
Ricks, Robert E.; and Robinson, William P., to Smith International, Inc. Temperature-regulated, sealed bearing system for rock drill bits. 3,964,554, Cl. 175-17.000.
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Suzuki, Shigeru; and Suzuki, Minoru, 3,964,648.
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Riddy, Frederick Thomas. Liquid fuel supply systems. 3,964,755, Cl. 280-5.00A.
Rieckmann, Peter: *See*—
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Riegel, Herbert; Sze, Morgan C.; and Schindler, Harvey D., to Lummus Company, The. Production of trichloro-ethylene from waste $C_2$ chlorinated hydrocarbons. 3,965,202, Cl. 260-654.00R.
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Ring, Wallace H.; Adair, John C.; and Elwyn, Richard A., to Ring, Wallace H. Tracheal tube. 3,964,488, Cl. 128-351.000.
Ringland, Robert S., to Tandy Corporation. Frequency modulated signal pre-amplifier with amplitude modulated signal bypass. 3,965,426, Cl. 325-375.000.
Riseman, John H.; and Frant, Martin, to Orion Research Incorporated. Electrochemical monitoring. 3,964,988, Cl. 204-195.00M.
Ritter, Paul. Method of forming moulded articles. 3,965,233, Cl. 264-219.000.
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Robertshaw Controls Company: *See*—
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Robillard, Jean Jules Achille, to La Cellophane. Photographic reproduction processes using diazonium salts and substituted spiro[benzopyrane]. 3,964,911, Cl. 96-49.000.
Robinson, Charles A., to American Home Products Corporation. Intermediates for preparing cephalosporins and methods of production. 3,965,098, Cl. 260-243.00C.
Robinson, William Derek: *See*—
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Rodgers, James T., to Standard Oil Company (Indiana). Underwater wellhead completions with portable atmospheric cellar. 3,964,543, Cl. 166-.500.
Roe, Douglas A.: *See*—
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Roller, William G., to G & R Industries, Inc. Live well valve. 3,964,510, Cl. 137-528.000.
Romano, Carlo, to Ing. C. Olivetti & C., S.p.A. Driving and control system for D.C. motors. 3,965,405, Cl. 318-331.000.
Romano, Gaetano; and Gorietti, Bruno, to Exxon Research and Engineering Company. Reducing undesirable components of automotive exhaust gas. 3,964,258, Cl. 60-274.000.
Romine, Hugh E., to Continental Oil Company. Removal of HF from the sludge resulting from the treatment of a hydrocarbon. 3,964,993, Cl. 208-13.000.
Romo, Edgar A., to International Telephone and Telegraph Corporation. Computer utilizing logarithmic function generators. 3,965,344, Cl. 235-197.000.
Rooks, Albert H.; and Vermilion, Everette E., to Rooks, Albert H. Electronic morning start-up control for a building temperature control system. 3,964,676, Cl. 236-46.00R.
Roques, Henri; and Roustan, Michel, to Produits Chimiques Ugine Kuhlmann. Method for breaking foams and apparatus useful therefor. 3,965,034, Cl. 252-321.000.
Rose, Sam, to BIO Response Inc. Methods and apparatus for augmentation of the production of anti-bodies in animals and humans and the collection thereof. 3,964,467, Cl. 128-1.00R.
Roselle, Pierce C.; and Zaborowski, Roy A., to Sperry Rand Corporation. A.C. potentiometer with bridge having voltage controllable devices. 3,965,410, Cl. 323-19.000.
Rosen, Sidney: *See*—
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Roy, Neal L.; and Hansen, David O., to TRW Inc. Parallel resonant circuit with feedback means for increasing Q. 3,965,441, Cl. 331-115.000.
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Rutkowski, Edward J.; and Sowinski, Gerard T., to National Gypsum Company. Control joint with tear strip. 3,964,220, Cl. 52-100.000.
Ryan, Thomas J., to North American Manufacturing Company, The. Annunciator structure and method. 3,965,469, Cl. 340-415.000.
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Saethre, Magnus, to Lawrence Peska Associates, Inc., a part interest. Child's bathing cabinet. 3,964,471, Cl. 128-65.000.
St. Clair, David J.; and Crossland, Ronald K., to Shell Oil Company. Lubricating compositions containing hydrogenated block copolymers as viscosity index improvers. 3,965,019, Cl. 252-59.000.
St. John, Ward A. Low velocity gas turbine with exhaust gas recycling. 3,964,254, Cl. 60-39.520.
Saint-Remy Pellissier, Charles Marc Marie, to Societe Anonyme Fondasol-Technique. Apparatus for measuring penetration of tubes of a penetrometer. 3,964,298, Cl. 73-84.000.
Saita, Katuyuki: *See*—
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Salsich, Peter W., Sr., to Playground Corporation of America. Basketball backboard structure. 3,964,743, Cl. 273-1.50R.
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Schenk, Erwin, to Siemens Aktiengesellschaft. Circuit arrangement for varying the phase of a reference signal in transmission path distortion measuring apparatus. 3,965,293, Cl. 178-69.00A.
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Schnizler, Albrecht, Jr., to Metawerke KG Closs, Rauch & Schnizler. Driver for nuts and screws. 3,964,332, Cl. 74-325.000.
Schober, Michael A., to Borg-Warner Corporation. Belleville spring. 3,964,737, Cl. 267-161.000.
Scholl, Charles H., to Nordson Corporation. Apparatus for melting and dispensing thermoplastic material. 3,964,645, Cl. 222-146.0HE.
Scholz, Helmuth, to Daimler-Benz Aktiengesellschaft. Load-dependent two-circuit brake for vehicles, especially for trucks, busses or the like. 3,964,794, Cl. 303-6.00C.
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Schultz, Neithart; Vahlensieck, Hans-Joachim; and Gebele, Rudolf, to Dynamit Nobel Aktiengesellschaft. Regeneration of bismuth containing catalyst used in the hydrofluorination of halogenated hydrocarbons. 3,965,038, Cl. 252-416.000.
Schulz, Werner P., to Leland Stanford Junior University, The Board of Trustees of. Bioptome. 3,964,468, Cl. 128-2.00B.
Schulze, James L., Sr., to General Electric Company. Air conditioning system mounting arrangement for a mobile home. 3,964,271, Cl. 62-239.000.
Schumacher, Ignatius, to Monsanto Company. Preparation of esters of phosphorus acids. 3,965,220, Cl. 260-975.000.
Schumacher, Ray F.; Prasek, David J.; and Van Stone, Howard L., to Ferro Corporation. Apparatus for advancing particulate material. 3,964,892, Cl. 65-328.000.
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Schwartz, Joseph. Sheet material cutting apparatus. 3,964,360, Cl. 83-464.000.
Schwellenbach, Robert D. Vehicle safety device for monitoring the operation of directional signal lamps. 3,965,456, Cl. 340-79.000.
Schwenninger, Ronald L., to PPG Industries, Inc. Apparatus for coating continuously advancing substrate. 3,964,432, Cl. 118-314.000.
Schwind, Roger A.: *See—*
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Sebek, Rolf, to Phoenix Armaturen Werke Bregel GmbH. Magnetically actuated fluid-level indicator. 3,964,312, Cl. 73-314.000.
Seemann, Fritz, to Sandoz Ltd. Oxindole derivatives. 3,965,095, Cl. 260-240.00J.
Seibert, Josef. Driving mechanism for a reciprocating engine. 3,964,323, Cl. 74-60.000.
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Shankwitz, Robert F.; and Garman, Anthony L., to Caterpillar Tractor Co. Tapered hinge pin assembly and removal means. 3,964,152, Cl. 29-427.000.
Sharp Kabushiki Kaisha: *See—*
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Sheaffer, John A., to Dorr-Oliver Incorporated. Endless filter belt. 3,965,011, Cl. 210-400.000.
Sheets, Kerney T. Lawn, farm, and orchard sprinklers. 3,964,687, Cl. 239-226.000.
Sheets, Kerney T. Lawn, farm, and orchard sprinklers. 3,964,688, Cl. 239-226.000.
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Shelby, William Barney. Helium reclamation. 3,964,866, Cl. 23-252.00R.
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Shin, Hiroshi; Sugano, Junichiro; Yoshii, Tadashi; Iwamoto, Kichiro; Kuriyama, Yasuhisa; and Kakuda, Minoru, to Mitsubishi Gas Chemical Company, Inc. Method of regenerating a degraded working solution for the production of hydrogen peroxide. 3,965,251, Cl. 423-588.000.

Shin Meiwa Industry Co., Ltd.: *See*—
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Shipman, Paul. Double cylinder lock bolt assembly. 3,964,281, Cl. 70-120.000.

Shipman, Vern D., to Headway Research, Inc. Electric motor housing with interior shield against liquids. 3,965,381, Cl. 310-88.000.

Shirai, Yukio: *See*—
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Shiroki, Masami: *See*—
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Sieber, Werner; Ganser, Friedrich; Hammer, Thomas; Vichrig, Wolfgang; Frick, Hans-Dieter; and Osegowitsch, Viktor, to AGFA-Gevaert, A.G. Apparatus for simultaneous viewing of both sides of webs of photographic paper or the like. 3,964,191, Cl. 40-86.00A.

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Siegmann, Carl: *See*—
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Silvis, Duane C.: *See*—
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Simmonds, Peter G.: *See*—
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Sindermann, Siegmar, to Holstein & Kappert Maschinenfabrik Phonix GmbH. Method and apparatus for cleaning rotary filling machines. 3,964,526, Cl. 141-1.00R.

Singer Company, The: *See*—
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Siren, Andrew Oscar. Automatic synchronized pitch controls for pairs of driver and driven V pulley drives. 3,964,327, Cl. 74-230.17A.

Sittmann, Brigitte, to Vereinigte Baubeschlagfabriken Gretsch & Co. GmbH. Heel hold-down mechanism for safety ski bindings. 3,964,757, Cl. 280-626.000.

Sivetz, Michael. Coffee roasting system. 3,964,175, Cl. 34-57.00A.

SKF Nova AB: *See*—
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Skilliter, Robert T., Jr.; and Pietrowski, Anthony P., to Acme Specialty Manufacturing Company. Equipment support assembly. 3,964,612, Cl. 211-26.000.

Skurko, Richard. Apparatus for continuously casting metal nuggets. 3,964,542, Cl. 164-329.000.

Slator, Damon T., to Brown Oil Tools, Inc. Drive connector with load compensator. 3,964,552, Cl. 173-164.000.

Sljudikov, Leonid Davydovich: *See*—
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Smart, Thomas John, to Dunlop Limited. Spacer-damper for overhead power transmission lines. 3,965,286, Cl. 174-42.000.

Smith, Dallas F.: *See*—
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Smith, Lawrence A., Jr., to Petro-Tex Chemical Corporation. Process for the production of 2-chlorobutadiene-1,3 from 3,4-dichlorobutene-1. 3,965,203, Cl. 260-655.000.

Smith, Mervyn J. H.: *See*—
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Smith, Randel P., to Singer Company, The. Patterning device for tufting machines or the like. 3,964,408, Cl. 112-79.00A.

Smith, Randel P., to Singer Company, The. Dense pile fabric. 3,964,411, Cl. 112-410.000.

Smith, Randel P.: *See*—
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Smith, Robert W.: *See*—
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Smith, William D.: *See*—
Basham, Edward R.; and Smith, William D., 3,964,553.

Smith, William E.; and Bowden, Charles J., to General Signal Corporation. System for providing auxiliary power. 3,964,566, Cl. 180-133.000.

Smith, William E.; and Gerhart, R. John, to General Electric Company. Process for preparing allylic esters of carboxylic acids. 3,965,152, Cl. 260-491.000.

Smith, William E.; and Gerhart, R. John, to General Electric Company. Process for preparing allylic esters of carboxylic acids and allylic alcohols. 3,965,153, Cl. 260-491.000.

Smith, William E.; and Gerhart, R. John, to General Electric Company. Process for preparing allylic esters of carboxylate acids and allylic alcohols. 3,965,154, Cl. 260-491.000.

Smith, William E.; and Gerhart, R. John, to General Electric Company. Process for preparing vinyl esters of carboxylic acids. 3,965,155, Cl. 260-491.000.

Smith, William E.; and Gerhart, R. John, to General Electric Company. Process for preparing vinyl esters of carboxylic acids. 3,965,156, Cl. 260-491.000.

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Smithson, Harold; and Stahl, John F., to Oxy-Catalyst, Incorporated. Catalyst changing system. 3,964,528, Cl. 141-67.000.

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Gambini, Arnaldo; and Terenziani, Demetrio, 3,964,171.
Priola, Aldo; Cesca, Sebastiano; and Ferraris, Giuseppe, 3,965,078.

Snell, Peter Garland. Acoustic system. 3,964,571, Cl. 181-150.000.

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Snyder, H. Ben, to General Dynamics Corporation. System for maintaining uniform copper etching efficiency. 3,964,956, Cl. 156-345.000.

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Societe Anonyme Fondasol-Technique: *See*—
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Societe Anonyme Machines Automatiques Cillotta: *See*—
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Societe Nationale des Poudres et Explosifs: *See*—
Plantif, Bernard E.; Doin, Bernard J.; and Beaumont, Jean S., 3,964,256.
Societe Nationale d'Etude et de Construction de Moteurs d'Aviation: *See*—
Lardellier, Alain Marie Joseph, 3,964,257.
Soffge, Friedhelm; and Albrecht, Gerhard, to Dr. -Ing. H.c.F. Porsche Aktiengesellschaft. Support leg for bridges. 3,964,119, Cl. 14-75.000.
Sohma, Hiroshi: *See*—
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Someya, Yoshiaki; Tateno, Noriaki; and Kageyama, Kunio, to Yokohama Rubber Co. Ltd., The. Process for the preparation of hydroxyl-terminated liquid polymers. 3,965,140, Cl. 260-465.600.
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Son, Pyong-Nae, to B. F. Goodrich Company, The. Cycloalkylthio(electron-withdrawing group substituted)aniline compounds. 3,965,077, Cl. 260-79.50P.
Sonnenberg, Darwin D. Bowling pin and ball sorting apparatus. 3,964,744, Cl. 273-43.00E.
Sontag, Glenn R.; and Tranholm, Benjamin M., to Milprint, Inc. Composite wrapper combining rigid and flexible elements. 3,964,669, Cl. 229-40.000.
Sopha, Klaus: *See*—
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Soula, Gerard; Metzger, Jacques; and Lena, Louis, to Rhone-Progil. Process for preparing halophenol sulfonic compounds and halophenols from halobenzene sulfonates. 3,965,158, Cl. 260-512.00R.
Soulen, John Richard, to Pennwalt Corporation. Complex antimony sulfides as lubricant additives. 3,965,016, Cl. 252-25.000.
South African Inventions Development Corporation, The: *See*—
Barnard, James Laing, 3,964,998.
Southwire Company: *See*—
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Sowinski, Gerard T.: *See*—
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Spandorfer, Lester M.: *See*—
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Spargo, John D. Balanced airflow control valve for helicopter blade. 3,964,838, Cl. 416-20.00R.
Specialty Products Development Corporation: *See*—
Catanzarite, Vincent Owen, 3,964,255.
Spector, George: *See*—
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Speiser, Jeffrey M.; and Whitehouse, Harper John, to United States of America, Navy. Modular system for performing the discrete fourier transform via the chirp-Z transform. 3,965,343, Cl. 235-156.000.
Speller, Frank N., Jr., to Esorco Corporation. Processes for secondarily recovering oil. 3,964,545, Cl. 166-256.000.
Spencer, James M., Jr., to Sperry Rand Corporation. Power on demand beam deflection system for CRT displays. 3,965,390, Cl. 315-397.000.
Spencer, John R.; and Kinney, Bruce W., Jr., to Rockwell International. Selectable eight or twelve digit integrated circuit calculator and conditional gate output signal modification circuit therefor. 3,965,459, Cl. 340-173.00R.
Sperry Rand Corporation: *See*—
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Roselle, Pierce C.; and Zaborowski, Roy A., 3,965,410.
Spencer, James M., Jr., 3,965,390.
Spier, Raymond E.: *See*—
McAleer, William J.; Posch, Kenneth L.; Baugh, Clarence L.; and Spier, Raymond E., 3,965,258.
Spooner, Frank H.: *See*—
Willingham, Charles B.; Parker, Thomas E.; and Spooner, Frank H., 3,965,444.
Sprague Electric Company: *See*—
Moorhead, William L.; and Kahn, Manfred, 3,965,392.
Peterson, Richard C.; Moynihan, John D.; and O'Shea, Martin W., 3,965,425.
Sprecace, Richard P.: *See*—
United States of America, National Aeronautics and Space Administration; Arcella, Frank G.; Phillips, Ernest C., Jr.; and Sprecace, Richard P., 3,964,902.
Spulgis, Ivars Sigurds: *See*—
Hickey, Thomas Nelson; and Spulgis, Ivars Sigurds, 3,964,887.
Spurrier, Mack W.: *See*—
Clifford, Graham Frank; and Spurrier, Mack W., 3,964,153.
Stade, Bertil; and Hoglund, Edward, to Mercury Metal Products, Inc. Anti-emission exhaust pipe joint and clamp therefor. 3,964,773, Cl. 285-367.000.
Stahl, Howard D., to General Foods Corporation. Dry carbonation source and method for preparing the same, and dry carbonated beverage concentrate. 3,965,273, Cl. 426-548.000.
Stahl, John F.: *See*—
Smithson, Harold; and Stahl, John F., 3,964,528.
Stahl, Lee W. Elastomeric orthodontic apparatus. 3,964,165, Cl. 32-14.00A.
Stahlheber, N. Earl, to Monsanto Company. Crystalline trisodium carboxymethyloxysuccinate monohydrate. 3,965,169, Cl. 260-535.00P.
Stahlman, Donald B., to Mynol, Inc. Dental prophylaxis implement. 3,964,166, Cl. 32-59.000.
Stahr, Henry M., to Iowa State University Research Foundation, Inc. Method for polarographic analysis using an electrode of tantalum/-carbon material. 3,964,981, Cl. 204-1.00T.
Stakmore Co., Inc.: *See*—
Schankman, Milton, 3,964,403.
Stamberg, Jiri: *See*—
Hradil, Jiri; Coupek, Jiri; Krivakova, Miroslava; Stamberg, Jiri; Stoy, Arthur; and Turkova, Jaroslava, 3,964,973.
Standard Oil Company: *See*—
Jezl, James L.; Peters, Edwin F.; Hall, Robert D.; and Shepard, John W., 3,965,083.
Standard Oil Company (Indiana): *See*—
Rodgers, James T., 3,964,543.
Stanford, James R.; and Vogelsang, Paul G., Jr., to Nalco Chemical Company. Scale inhibition and compounds therefor. 3,965,003, Cl. 210-58.000.
Stankovich, Frank M. Device to hang a bicycle on an airplane wing. 3,964,699, Cl. 244-118.00R.
Stapp, Hans: *See*—
Werner, Helmut; and Stapp, Hans, 3,964,249.
Staudinger, Gernot, to Shell Oil Company. Partial combustion process. 3,964,882, Cl. 48-215.000.
Staudte, Walter J., Jr. Apertured panel bracket. 3,964,712, Cl. 248-223.000.
Stauffer Chemical Company: *See*—
Fancher, Llewellyn W., 3,965,137.
Jin, Jung Il, 3,965,067.
Jin, Jung Il, 3,965,216.
Shim, Kyung S.; and Walsh, Edward N., 3,965,217.
Steel, Thomas C., to Federal Paper Board Company, Inc. Carton for a package convertible to a baking pan. 3,964,671, Cl. 229-51.0TS.
Steelcase, Inc.: *See*—
Platner, Warren; Ursul, Earl G.; Kolk, Stephen B.; and Whitwam, Ronald L., 3,964,789.
Stefano, Rocco L.; and Galland, Robert J., to Unipunch Products, Inc. Punching apparatus with mechanically movable tool support arm. 3,964,358, Cl. 83-400.000.
Steinmann, Helmut: *See*—
Hemmann, Rainer; and Steinmann, Helmut, 3,964,444.
Steinmetz, Dietmar, to Kabelschlepp Gesellschaft mit beschrankter Haftung. Wiping device for telescopically displaceable cover boxes of covering devices on sliding and guiding paths of machine tools. 3,964,801, Cl. 308-3.500.
Stelling, William Taylor. Adjustable anchor. 3,964,420, Cl. 114-208.00R.
Stelniceanu, Jacques Dominique. Wheeled push-cart having the upper portion of the handle lowerable for convenience of carrying. 3,964,763, Cl. 280-47.170.
Stemmler, Kurt: *See*—
Ehlscheid, Gunter; Langenbeck, Peter; and Stemmler, Kurt, 3,965,327.
Stenberg, Nyyrikki K., to Dart Industries Inc. Linear response flow meter. 3,964,310, Cl. 73-207.000.
Stenstrom, Borje Harald, to Salen & Wicander AB. Method and device for ascertaining small amounts of oil in water. 3,964,295, Cl. 73-61.10R.
Stenzel, Hans-Dieter: *See*—
Werwitzke, Lothar; Stenzel, Hans-Dieter; and Voigt, Hermann Uwe, 3,965,226.
Stepina, Jaroslav, to Siemens Aktiengesellschaft. Sliding armature braking motor. 3,965,380, Cl. 310-77.000.
Stepniczka, Heinrich, to Michigan Chemical Corporation. Process for the complete bromination of non-fused ring aromatic compounds. 3,965,197, Cl. 260-623.00H.
Sterling Drug Inc.: *See*—
Zenitz, Bernard L., 3,965,105.
Sterman, Albert P.; Brands, Henry J.; and Weissborn, Frederick W., Jr., to General Electric Company. Combustor-turbine nozzle interconnection. 3,965,066, Cl. 60-39.320.
Sternbach, Leo Henryk: *See*—
Derieg, Michael Edward; Earley, James Valentine; Fryer, Rodney Ian; and Sternbach, Leo Henryk, 3,965,151.
Stievenart, Emile Frans; Van Bouwel, Leo Paul; and Plessers, Hendrik Sylvester, to AGFA-GEVAERT N.V. Radiographic film cassette. 3,964,107, Cl. 250-468.000.
Stiles, Claude J., to National Distillers and Chemical Corporation. Ethylene/vinyl acetate/isobutylene terpolymer coating composition. 3,965,062, Cl. 260-28.5AV.
Stivers, Edward C.; and Fischer, Christopher L., to Raychem Corporation. Needle foot shoe for knitting needle. 3,964,274, Cl. 66-123.000.

Stocker, Charles T.; Schara, Robert E.; Marshall, William E.; Hayes, John T., Jr.; and Glicksman, Martin, to General Foods Corporation. Expanded protein product comprising sulfur-containing organic compound. 3,965,268, Cl. 426-331.000.

Stoddard, Terence C.: *See—*
Wreede, John E.; Stoddard, Terence C.; and Erikson, Kenneth R., 3,965,461.

Stoferle, Theodor; Klaar, Jochen; Bellmann, Bernhard; and Theimert, Paul-Heinz, to Stoferle, Theodor; and Klaar, Jochen. Device for machining trochoidal inner walls, especially for the cylinders of Wankel engines. 3,964,367, Cl. 90-11.00C.

Stolkin, Walter J.; Riley, William A.; and Sejda, Henry, to Stolmar Corporation. Carton folding and glueing device. 3,964,374, Cl. 93-36.0MM.

Stolmar Corporation: *See—*
Stolkin, Walter J.; Riley, William A.; and Sejda, Henry, 3,964,374.

Stone, G. W. (Charles), to Agriculture Research Incorporated. Cotton harvesting machine. 3,964,242, Cl. 56-30.000.

Stoner, Thomas A., to Bucyrus-Erie Company. Method and means for measuring the torque delivered by an electric motor. 3,965,407, Cl. 318-432.000.

Storey, Raymond Nichols: *See—*
Bergman, John George, Jr.; Crane, Glen Robert; Storey, Raymond Nichols; and Williams, Denise, 3,965,375.

Storms, James G., to J. E. Love Company. Tree seedling harvester. 3,964,550, Cl. 171-61.000.

Stott, Robert C. Lift bail assembly for log truck trailers. 3,964,776, Cl. 294-74.000.

Stout, Ronald M. T.; and Rogerson, Douglas E., to MacMillan Bloedel Limited. Adhesive extended composition. 3,965,056, Cl. 260-17.200.

Stoy, Arthur: *See—*
Hradil, Jiri; Coupek, Jiri; Krivakova, Miroslava; Stamberg, Jiri; Stoy, Arthur; and Turkova, Jaroslava, 3,964,973.

Stoy, Artur; Stoy, Vladimir; Urbanova, Renata; Prokop, Jaroslav; and Kucera, Josef, to Ceskoslovenska akademie ved. Method of simultaneously manufacturing acrylic fibers and nitrates. 3,965,227, Cl. 264-38.000.

Stoy, Vladimir: *See—*
Stoy, Artur; Stoy, Vladimir; Urbanova, Renata; Prokop, Jaroslav; and Kucera, Josef, 3,965,227.

Strachan & Henshaw Limited: *See—*
Alsop, Arthur Graham, 3,964,598.

Strategic Medical Research Corporation: *See—*
Gordon, Paul, 3,965,262.

Strauss, Robert F.; and Lawrenz, Carl F., to Service Dynamics, Inc. Service vehicle for manhole operation. 3,964,458, Cl. 123-122.00H.

Strecker, Richard A.; and Verderame, Frank D., to United States of America, Army. Isotactic and syndiotactic polyvinyl nitrates and processes for their formation. 3,965,081, Cl. 526-9.000.

Street, William M.; and Edmonds, David L. Flush valve assembly. 3,964,109, Cl. 4-67.00A.

Strickland, Robert V. Powered drapery table. 3,964,186, Cl. 38-102.100.

Stridde, George E., to NL Industries, Inc. Catalyst for alkylating aromatic hydrocarbons therefor. 3,965,043, Cl. 252-455.00R.

Striegler, Werner: *See—*
Mall, Gunther; and Striegler, Werner, 3,964,409.

Strong, Doyle L.; and Hargadine, Curtis Dale, to Minnesota Mining and Manufacturing Company. Pressure-fixable developing powder. 3,965,022, Cl. 252-62.10P.

Strongin, Myron; Varma, Matesh Narayan; and Anne, Joshi, to United States of America, Energy Research and Development Administration. Differential auger spectrometry. 3,965,351, Cl. 250-305.000.

Strutz, Glenn L., to Tote Pak Co. Padded carrying strap construction. 3,964,653, Cl. 224-5.00P.

Strycek, Oldrich, to Sigma Lutin, Narodni Podnik. Impeller blades. 3,964,841, Cl. 416-186.00R.

Stuart, Karl D.; Sulcs, Juris; and Wright, P. Kennard, III, to General Electric Company. Electric lamp and thermal switch therefore. 3,965,387, Cl. 315-47.000.

Stubbs, Dennis; Maltby, Jack; and Oxlade, Roy Ronald, to British Steel Corporation; and British Iron and Steel Research Association, The. Rolling mills. 3,964,282, Cl. 72-19.000.

Studiengesellschaft Kohle m.b.H.: *See—*
Eisenbach, Wilhelm; Lehmkuhl, Herbert; and Wilke, Gunther, 3,964,983.
Wilke, Gunther; and Heimbach, Paul, 3,965,142.

Stumpf, Elmer J., to Beemak Plastics. Adjustable coin display device. 3,964,187, Cl. 40-27.500.

Stunkel, Helmut: *See—*
Kausz, Ivan; Stunkel, Helmut; and Wille, Harald, 3,964,965.

Sturtevant, Rodney Lee. Condenser lug extractor. 3,964,148, Cl. 29-203.00H.

Sudo, Katsuzo: *See—*
Aramaki, Seigo; Sudo, Katsuzo; Tani, Mitsuo; Sato, Takehiko; Onishi, Yuuji; and Sakaguchi, Nobuhiro, 3,964,873.

Sugai, Masayoshi: *See—*
Morita, Tomijiro; Funahashi, Isao; Sugai, Masayoshi; Sasakawa, Atushi; and Takaiwa, Masakazu, 3,965,242.

Sugano, Junichiro: *See—*
Shin, Hiroshi; Sugano, Junichiro; Yoshii, Tadashi; Iwamoto, Kichiro; Kuriyama, Yasuhisa; and Kakuda, Minoru, 3,965,251.

Sulcs, Juris: *See—*
Stuart, Karl D.; Sulcs, Juris; and Wright, P. Kennard, III, 3,965,387.

Sullins, John K., to Canton Textile Mills, Inc. Method and apparatus for precipitating colloids from aqueous suspensions. 3,964,991, Cl. 204-275.000.

Sulzer Brothers Limited: *See—*
Bosshard, Ernst, 3,965,359.

Sumida, Shizuo; Nii, Kazuo; Shimizu, Osamu; Ueda, Atsushi; and Ishii, Mitsuaki, to Mitsubishi Denki Kabushiki Kaisha; and Toyo Kogyo Co., Ltd. Electrical devices control system. 3,965,366, Cl. 307-39.000.

Sumitomo Chemical Company, Limited: *See—*
Hirooka, Masaaki; Fujii, Yoshikazu; Morita, Shigeru; Namazue, Isamu; and Hata, Kazuhiko, 3,964,955.
Maruyama, Isamu; Nakao, Masaru; Sasajima, Kikuo; Inaba, Shigeho; and Yamamoto, Hisao, 3,965,106.

Sun Shipbuilding & Drydock Company: *See—*
Garber, Daniel C., 3,965,004.

Sun-Sor GmbH: *See—*
Anetseder, Leopold, Sr.; and Anetseder, Leopold, Jr., 3,965,348.

Sun Ventures, Inc.: *See—*
Driscoll, Gary L., 3,965,229.
Norton, Richard V., 3,965,160.

Sunbeam Corporation: *See—*
Komatsu, Ikuo I., 3,964,502.

Sundeen, Joseph E.: *See—*
Hauck, Frederic Peter; and Sundeen, Joseph E., 3,965,102.

Sundstrand Data Control, Inc.: *See—*
Joseph, John S.; and Levinson, Edwin B., 3,964,826.

SunPano, Allan: *See—*
Biliunas, Leo; and SunPano, Allan, 3,964,201.

Suter, Hubert: *See—*
Wirth, Friedrich; Renauer, Erich; Von Ammon, Hans; Schneider, Curt; and Suter, Hubert, 3,965,126.

Suzuki, Minoru: *See—*
Suzuki, Shigeru; and Suzuki, Minoru, 3,964,648.

Suzuki, Nobuo, to Technical Incorporated. All-plastic housing for a small compact tape reproducer and recorder. 3,964,808, Cl. 312-8.000.

Suzuki, Shigeru; and Suzuki, Minoru, to Ricoh Co., Ltd. Toner supply device for copying apparatus. 3,964,648, Cl. 222-333.000.

Swain, Ronald Bruce; and O'Connor, David Evans, to Procter & Gamble Company, The. Process for producing protein concentrate (case) I using air classification. 3,965,086, Cl. 260-123.500.

Swanson, Fred T., to Caterpillar Tractor Co. Track shoe with staggered grousers. 3,964,797, Cl. 305-54.000.

Swartz, Robert L., to Oscar Mayer & Co. Inc. Loaf mold washing and release agent applying mechanisms. 3,964,433, Cl. 118-314.000.

SWF-Spezialfabrik fur Autozubehor Gustav Rau GmbH: *See—*
Mutschler, Erich; and Weber, Adam, 3,965,313.

Swift & Company: *See—*
Connick, Francis G., 3,964,313.

Swimm, Walter Thomas, to Purdue Frederick Company, The. Choline salicylate compositions and methods for achieving analgesia. 3,965,263, Cl. 424-184.000.

Swinkels, Godefridus Maria; Furber, Robert Arthur; Milner, Edward Francis Godfrey; Genik-Sas-Berezowsky, Roman Michael; and Kirby, Charles Ray, to Sherritt Gordon Mines Limited; and Cominco Ltd. Production of copper and sulfur from copper-iron sulfides. 3,964,901, Cl. 75-108.000.

Sybron Corporation: *See—*
Ellis, Franklin H.; and Andrews, Stephen W., 3,964,477.
Reser, G. Louis, 3,965,361.

Sykes, James A., Jr., to Shell Oil Company. Selective removal of sulfur compounds from acid gas mixtures containing significant quantities of carbonyl sulfide. 3,965,244, Cl. 423-228.000.

Synchro-Motion Corporation: *See—*
Mort, Paul R., Jr.; and Cleary, Robert A., 3,964,947.

Synergistics: *See—*
Leslie, Stewart Thomas, 3,965,256.

Syntex Puerto Rico, Inc.: *See—*
Mathes, Stanley, 3,964,483.

Syntex (U.S.A.) Inc.: *See—*
Beard, Colin C.; Edwards, John A.; and Fried, John H., 3,965,113.
Marx, Michael, 3,965,181.
Pfister, Jurg R.; Harrison, Ian T.; and Fried, John H., 3,965,115.

Synthelabo: *See—*
Giudicelli, Don Pierre Rene Lucien; and Najer, Henry, 3,965,190.

Syrovatka, George Eugen. Ski boot heel attachment device. 3,964,761, Cl. 280-623.000.

Syson, John William: *See—*
Kerridge, John Charles; and Syson, John William, 3,965,059.

Syva Company: *See—*
Packard, Martin E.; Ullman, Edwin F.; and Burkoth, Terry L., 3,965,144.

Szabo, Gabor: *See—*
Toth, Geza; Szabo, Gabor; Eibel, Gyorgy; and Somfai, Eva, 3,964,894.

Szabo, Laszlo: *See—*
Johan, Bela; Szemler, Laszlo; Fulop, Janos; Szontagh, Tamas; Simonovits nee Czink, Emilia; Bekes nee Erdos, Judit; Kuti, Laszlo; Toros, Robert; Szekely, Denes; Szabo, Laszlo; Seitz, Karoly; Vajda, Tade; Kovacs nee Komoroczy, Erzsebet; Hargital nee Franyo, Aniko; and Polinszky, Karoly, 3,964,971.

Sze, Morgan C.; and Unger, Harold, to Lummus Company, The. Production of formaldehyde in carbon steel reactors. 3,965,194, Cl. 260-603.0HF.

Sze, Morgan C.: *See—*
Riegel, Herbert; Sze, Morgan C.; and Schindler, Harvey D., 3,965,202.

Szeberenyi, Szabolcz: *See—*
Toth, Edit; Torley, Jozsef; Gorog, Sandor; Szporny, Laszlo; Palosi, Eva; and Szeberenyi, Szabolcz, 3,965,179.

Szekely, Denes: *See—*
Johan, Bela; Szemler, Laszlo; Fulop, Janos; Szontagh, Tamas; Simonovits nee Czink, Emilia; Bekes nee Erdos, Judit; Kuti, Laszlo; Toros, Robert; Szekely, Denes; Szabo, Laszlo; Seitz, Karoly; Vajda, Tade; Kovacs nee Komoroczy, Erzsebet; Hargital nee Franyo, Aniko; and Polinszky, Karoly, 3,964,971.

Szemler, Laszlo: *See—*
Johan, Bela; Szemler, Laszlo; Fulop, Janos; Szontagh, Tamas; Simonovits nee Czink, Emilia; Bekes nee Erdos, Judit; Kuti, Laszlo; Toros, Robert; Szekely, Denes; Szabo, Laszlo; Seitz, Karoly; Vajda, Tade; Kovacs nee Komoroczy, Erzsebet; Hargital nee Franyo, Aniko; and Polinszky, Karoly, 3,964,971.

Szontagh, Tamas: *See—*
Johan, Bela; Szemler, Laszlo; Fulop, Janos; Szontagh, Tamas; Simonovits nee Czink, Emilia; Bekes nee Erdos, Judit; Kuti, Laszlo; Toros, Robert; Szekely, Denes; Szabo, Laszlo; Seitz, Karoly; Vajda, Tade; Kovacs nee Komoroczy, Erzsebet; Hargital nee Franyo, Aniko; and Polinszky, Karoly, 3,964,971.

Szporny, Laszlo: *See—*
Toth, Edit; Torley, Jozsef; Gorog, Sandor; Szporny, Laszlo; Palosi, Eva; and Szeberenyi, Szabolcz, 3,965,179.

Tabata, Tomokazu; and Ikushige, Tetsuo, to Toyo Soda Manufacturing Co., Ltd. Method of recovering uranium. 3,965,238, Cl. 423-8.000.

Tagliaferri, Olindo A., to United States of America, Air Force. System channel distortion weighting for predetection combiners. 3,965,422, Cl. 325-305.000.

Tahara, Tetsuya: *See—*
Nakanishi, Michio; Araki, Kazuhiko; Tahara, Tetsuya; and Shiroki, Masami, 3,965,111.

Takaiwa, Masakazu: *See—*
Morita, Tomijiro; Funahashi, Isao; Sugai, Masayoshi; Sasakawa, Atushi; and Takaiwa, Masakazu, 3,965,242.

Takase, Takashi; Hayashi, Tsunekazu; and Saitoh, Hirokazu, to Mitsuboshi-Sangyo Co., Ltd. Method for paving surfaces with granular, flaky or powdery asphalt. 3,965,281, Cl. 427-139.000.

Takeda, Harumi: *See—*
Sato, Takashi; Saita, Katuyuki; Naito, Tadashi; and Takeda, Harumi, 3,964,223.

Tamura, Takashi: *See—*
Yamada, Yasuhiro; Tsukamoto, Kazuyoski; Sakauchi, Yoshiaki; Tamura, Takashi; and Saito, Yukio, 3,965,288.

Tanaka, Hidetoshi; Kasamura, Toshiro; and Sato, Tadashi, to Canon Kabushiki Kaisha. Ion modulated image forming apparatus. 3,964,827, Cl. 355-3.00R.

Tandy Corporation: *See—*
Ringland, Robert S., 3,965,426.

Tani, Mitsuo: *See—*
Aramaki, Seigo; Sudo, Katsuzo; Tani, Mitsuo; Sato, Takehiko; Onishi, Yuuji; and Sakaguchi, Nobuhiro, 3,964,873.

Tansley, Henry William. Electromagnetic door holding device. 3,964,125, Cl. 16-48.500.

Tapco International, Inc.: *See—*
Jandrasi, Frank J.; and Purvis, Howard A., 3,964,507.

Tarasova, Nina Vasilievna; Obolnikova, Elena Abramovna; Gololobov, Alexandr Dmitrievich; Samokhvalov, Gleb Ivanovich; Chepigo, Sergei Vladimirovich; Ivanova, Galina Ivanovna; Imshenetsky, Vladimir Vasilievich; and Kulikova, Vera Mikhailovna. Method for preparing ergosterol and ubiquinone-9 in a single process. 3,965,130, Cl. 260-396.00R.

Tateno, Noriaki: *See—*
Someya, Yoshiaki; Tateno, Noriaki; and Kageyama, Kunio, 3,965,140.

Taub, David: *See—*
Kuo, Chan-Hwa; Taub, David; and Wendler, Norman L., 3,965,120.

Tauleigne, Rene. Apparatus for forming a piecing end on a yarn winding. 3,964,690, Cl. 242-18.0PW.

Tauster, Samuel J.: *See—*
Fung, Shun Chong; and Tauster, Samuel J., 3,964,933.

Taylor, Brian W.: *See—*
Kobylinski, Thaddeus P.; Taylor, Brian W.; and Vogel, Roger F., 3,965,040.

Teass, Horace A., Jr. Temperature compensated conductivity measuring system. 3,965,414, Cl. 324-30.00R.

TEC Systems, Inc.: *See—*
Hella, Terry A., 3,964,656.

Technical Incorporated: *See—*
Suzuki, Nobuo, 3,964,808.

Technicon Instruments Corporation: *See—*
Adler, Stanford L.; and Saunders, Alexander M., 3,964,434.

Teitel, Sidney: *See—*
Perry, Clark William; and Teitel, Sidney, 3,965,121.
Perry, Clark William; and Teitel, Sidney, 3,965,129.

Tekade Felten & Guilleaume Fernmeldeanlagen GmbH: *See—*
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Tektronix, Inc.: *See—*
Winston, Fendall Gregory, IV, 3,965,438.

Telang, Yeshwant P., to Ford Motor Company. Apex seal material. 3,964,145, Cl. 29-182.000.

Telectronics Pty. Limited: *See—*
Wickham, Geoffrey Gordon; and Dwyer, Allen Frederick, 3,964,473.

Teleflex Incorporated: *See—*
Horvath, Louis T.; and Allen, Clifford H., 3,964,344.
Pardington, Lawrence D., 3,964,337.

Telesov, Savely Adolfovich: *See—*
Krupman, Leonid Isaakovich; Okonishnikov, Ary Mikhailovich; Sochnev, Alexandr Egorovich; Gavronsky, Boris Viktorovich; Popov, Viktor Alexeevich; Kalashnik, Anatoly Nikolaevich; Chumachenko, Vasily Sergeevich; Gudkevich, Veniamin Mikhailovich; Panev, Georgy Alexeevich; Detochka, Vasily Ivanovich; Telesov, Savely Adolfovich; Pokrass, Leonid Moiseevich; Ofengenden, Abram Mikhailovich; Nesterovich, Raisa Petrovna; and Zhitnik, Georgy Gavrilovich, 3,964,900.

Temple, Roderick R. Vending machine coin changer. 3,964,589, Cl. 194-10.000.

Terazawa, Yasuto; and Imamaru, Fumio, to Toyo Kogyo Co., Ltd. Seal means for rotary piston engine. 3,964,843, Cl. 418-83.000.

Terenziani, Demetrio: *See—*
Gambini, Arnaldo; and Terenziani, Demetrio, 3,964,171.

Texaco Inc.: *See—*
Allen, Joseph C., 3,964,546.
Harrison, Charles W.; and Senters, Glenn A., 3,964,975.
Kuntschik, Lawrence F.; and Edwards, Robert S., 3,965,177.
Morduchowitz, Abraham, 3,964,954.

Texas Dynamatics, Inc.: *See—*
Fogle, Stephen Fuller, 3,964,558.

Texas Instruments Incorporated: *See—*
Emmons, Stephen Perry, 3,965,368.
Gordon, James Sneddon; and den Brinker, Carl Siegmund, 3,964,302.
Jones, Derick; and Lu, Sun, 3,965,030.
Williams, Clark R., 3,964,251.

Textron, Inc.: *See—*
Earl, T. Desmond, 3,964,698.
Moertel, George B., 3,964,150.
Schmidt, Erich A.; and Schmidt, Volker E., 3,964,661.
Silvis, Richard R.; and Ettinger, John A., 3,964,615.

Thary, Christian: *See—*
Labadie, Jean Francois; Bernard, Armand R.; de la Taille, Olivier P.; and Thary, Christian, 3,964,787.

Theimert, Paul-Heinz: *See—*
Stoferle, Theodor; Klaar, Jochen; Bellmann, Bernhard; and Theimert, Paul-Heinz, 3,964,367.

Theissen, Hans: *See—*
Budich, Wolfgang; Krah, Robert; and Theissen, Hans, 3,964,231.

Thettu, Raghulinga R., to Xerox Corporation. Selective fusing apparatus. 3,965,332, Cl. 219-216.000.

Thien, Gerhard; Fachbach, Heinz; and Greier, Josef, to List, Hans. Cooler-cum-blower assembly for internal combustion engines. 3,964,449, Cl. 123-41.510.

Thien, Gerhard; and Fachbach, Heinz, to List, Hans. Sound-proofed internal combustion engine. 3,964,462, Cl. 123-198.00E.

Thiokol Corporation: *See—*
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Thomas & Betts Corporation: *See—*
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Viker, Harris W.; and Kropp, William E., to Minnesota Mining and Manufacturing Company. Can closure. 3,964,415, Cl. 113-121.00C.
Villarreal-Dominguez, Enrique. Lead dioxide-zinc rechargeable-type cell and battery and electrolyte therefor. 3,964,927, Cl. 136-26.000.
Vitale, Paul, to Pickering & Company, Inc. Phonograph cartridge replaceable stylus assembly. 3,964,751, Cl. 274-37.000.
Vogel, Roger F.: *See—*
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Volpeliere, Jacky, to Aluminium Pechiney. Continuous flow pneumatic conveyor system employing a fluidized bed column for the purposes of control and regulation. 3,964,793, Cl. 302-3.000.
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Wagner, Heinrich; Karcher, Karl-Friedrich; and Merkle, Otto, to Zahnradfabrik Friedrichshafen AG. Power boost steering mechanism. 3,964,371, Cl. 91-434.000.
Wajaroff, Theodor; Konrad, Eugen; and Hoch, Dieter, to Wella AG. Process for permanently shaping hair. 3,964,499, Cl. 132-7.000.
Walker, Frank A., Jr.; and Shevlin, John B. Pushbutton capacitive transducer. 3,965,399, Cl. 317-249.00R.
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Wang, Raymond C., to Motorola, Inc. Method of making isolated complementary monolithic insulated gate field effect transistors. 3,964,941, Cl. 148-187.000.
Wang, Ting M.; Richardson, Walter H., deceased; and by Richardson, Gregory R., administrator, to Borg-Warner Corporation. Control valve for a wet clutch. 3,964,587, Cl. 192-113.00B.
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Watson, James M., to Cosden Technology, Inc. NO polymerization inhibitor for vinyl aromatic compound distillation. 3,964,979, Cl. 203-9.000.
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Werner, Helmut; and Stapp, Hans, to Akzona Incorporated. Yarn with random denier fluctuations. 3,964,249, Cl. 57-140.00J.

Werwitzke, Lothar; Stenzel, Hans-Dieter; and Voigt, Hermann Uwe, to Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft. Method of providing a thick concentric envelope on an electrical conductor. 3,965,226, Cl. 264-25.000.

Wesemeyer, Jurgen; Schrumpf, Hans; Meier, Werner; and Haubner, Georg, to Robert Bosch G.m.b.H. Capacitor type magneto ignition system with diode-protected shutdown switch. 3,964,461, Cl. 123-198.0DC.

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Weston, David. Concentration of gold, sulphide minerals and uranium oxide minerals by flotation from ores and metallurgical plant products. 3,964,997, Cl. 209-166.000.

Westover, Dwight G., to Bell & Howell Company. Apparatus for cutting sheet material. 3,964,359, Cl. 83-430.000.

Westphal, Werner, to Koh-I-Noor Rapidograph, Inc. Cleansing receptacle for capillary writing pen parts. 3,964,926, Cl. 134-117.000.

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White, Charles S. Low friction bushing and method. 3,964,807, Cl. 308-238.000.

White, Charles S. Method of making a low friction bushing. 3,965,235, Cl. 264-294.000.

White, Hollis N., Jr., to TRW Inc. Hydraulic device. 3,964,842, Cl. 418-15.000.

White, Jackie L., to R. J. Reynolds Tobacco Company. Compositions for smoking. 3,964,494, Cl. 131-17.00R.

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White, Jackie L., to R. J. Reynolds Tobacco Company. Smoking materials. 3,964,498, Cl. 131-17.00R.

White, Woodrow W.: *See—*
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Whitmore, Charles H.; Houtman, Paul K.; and Engelter, Elwyn E., to Parker-Hannifin Corporation. Vane pump. 3,964,844, Cl. 418-133.000.

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Wickham, Geoffrey Gordon; and Dwyer, Allen Frederick, to Telectronics Pty. Limited. Bone prosthesis. 3,964,473, Cl. 128-82.100.

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Wiele, Dietrich; and Riemann, Jurgen, to Schering Aktiengesellschaft. Process for the purification of crude chenodeoxycholic acid. 3,965,131, Cl. 260-397.100.

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Wilkas, Joseph R.; Kapsambelis, Christos B.; Tuhro, Richard H.; and Reynolds, Christopher C., to Computer Identics Corporation. Magnetic object detection. 3,964,703, Cl. 246-34.00R.

Wilke, Gunther; and Heimbach, Paul, to Studiengesellschaft Kohle m.b.H. Production of alicyclic unsaturated compounds having pendent functional groups. 3,965,142, Cl. 260-468.00R.

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Williams, Berdell. Anti-sway trailer hitch. 3,964,767, Cl. 280-446.00B.

Williams, Brian David; Perkins, David; and Dale, Dennis George, to Plessey Handel und Investments A.G. Electrical solid-state devices. 3,964,156, Cl. 29-579.000.

Williams, Clark R., to Texas Instruments Incorporated. Watch system having asynchronous counters implemented by D and inverted D flip-flops. 3,964,251, Cl. 58-23.00R.

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Williams, Kenneth S., to Motorola, Inc. Thermal printer head using resistor heater elements as switching devices. 3,965,330, Cl. 219-216.000.

Williams, Marshall L.; and Peschel, William P., to Hydrobike Incorporated. Water vehicles. 3,964,417, Cl. 114-66.50H.

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Williams, William O., Jr. Fishing lure. 3,964,203, Cl. 43-42.020.

Williamson, John C., Jr. Rectangular metal-tubing bender. 3,964,289, Cl. 72-381.000.

Willingham, Charles B.; Parker, Thomas E.; and Spooner, Frank H., to Raytheon Company. Temperature compensated surface acoustic wave devices. 3,965,444, Cl. 333-30.00R.

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Winston, Fendall Gregory, IV, to Tektronix, Inc. Frequency locking system for a voltage controlled sweep frequency oscillator. 3,965,438, Cl. 331-1.00A.

Wirbilowicz, Chester; and Young, H. Theodore, to Becton, Dickinson and Company. Modular cabinet structure. 3,964,809, Cl. 312-111.000.

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Wirz, Herbert A., to Ernst Wirz AG, Kipper- & Maschinenfabrik. Apparatus provided at a vehicle for tilting and loading and unloading a receptacle by a rolling action. 3,964,625, Cl. 214-502.000.

Wise, Colleen M. Wooden camping tool. 3,964,161, Cl. 30-142.000.

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Wolf, Siegfried, to Bayern-Chemie Gesellschaft fur Flugchemische Antriebe mit beschrankter Haftung. Pyrochemical gas generator. 3,964,394, Cl. 102-39.000.

Wolfe, Jerry D., to Dayco Corporation. Endless power transmission belt. 3,964,329, Cl. 74-233.000.

Wolk, Ronald H.; Alpert, Seymour B.; and Chervenak, Michael C., to Hydrocarbon Research, Inc. Hydrodesulfurization process. 3,964,995, Cl. 208-210.000.

Wollin, David W.; and Cook, James E., to IRECO Industries, Inc. Irrigation line coupler. 3,964,774, Cl. 285-409.000.

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Wood, William Laurence, to Davy Powergas Limited. Hydrocarbon recovery process. 3,965,196, Cl. 260-604.00R.

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Worrel, Calvin J., to Ethyl Corporation. Preparation of aniline from phenol and ammonia. 3,965,182, Cl. 260-578.000.

Woyden, Stanley. Precious metal recovery system. 3,964,990, Cl. 204-275.000.

Wray, Gary Q.; and Holden, John C., to Halliburton Company. Apparatus for testing oil wells. 3,964,305, Cl. 73-151.000.

Wreede, John E.; Stoddard, Terence C.; and Erikson, Kenneth R., to McDonnell Douglas Corporation. Thermoplastic image recording system. 3,965,461, Cl. 340-173.0TP.

Wright, Leon W., to ICI United States Inc. Hydrogenation and hydrogenolysis of carbohydrates with tungsten oxide promoted supported nickel catalyst. 3,965,199, Cl. 260-635.00C.

Wright, Oliver L.; and Wright, Wilbur D. Torsion bar adaptor for vehicle springs. 3,964,735, Cl. 267-25.000.

Wright, P. Kennard, III: *See—*
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Wright, Thomas H. Calibration shaft assembly for engine valve adjustment. 3,964,172, Cl. 33-181.0AT.

Wright, Thomas J. Reinforcing teaching system. 3,964,177, Cl. 35-9.00C.

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Wuchter, Richard B., to Rohm and Haas Company. Crosslinked vinylcarbonyl resins having α-amino acid functionality. 3,965,070, Cl. 260-73.00R.

Wuenn, Guenter J. Universally mounted, pivoted key actuctor and associated switch assembly. 3,965,315, Cl. 200-6.00A.

Xanthos, Marinos; and Woodhams, Raymond T., to Canadian Patents and Development Limited. Chemically opening chrysotile asbestos and encapsulating. 3,965,284, Cl. 428-404.000.

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Yale, Harry L., to E. R. Squibb & Sons, Inc. 2,3-Dihydrocyclopenta[d-]pyrido[1,2-a]pyrimidin-10(1H)-one and its derivatives. 3,965,100, Cl. 260-251.00A.

Yale, Harry Louis; and Petigara, Ramesh B., to E. R. Squibb & Sons, Inc. 1-(o-Bromo-phenoxyalkyl)-1,2-dihydro-2-iminopyrimidines. 3,965,101, Cl. 260-256.40H.

Yamada, Hiroshi; Ataka, Hisanori; and Shirai, Yukio, to Ricoh Co., Ltd. Apparatus for preparing electrophotographic microfilm. 3,964,828, Cl. 355-10.000.

Yamada, Nobuo: *See—*
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Yamada, Yasuhiro; Tsukamoto, Kazuyoski; Sakauchi, Yoshiaki; Tamura, Takashi; and Saito, Yukio, to Sanyo Electric Co., Ltd. Automatic tuning apparatus. 3,965,288, Cl. 178-5.80A.

Yamaguchi, Takeshi, to Cleland, Ernest K. Electrical resistant fluid-permeable heat generating member and method of producing the same. 3,965,047, Cl. 252-503.000.

Yamaha, Hatsudoki Kabushiki Kaisha: *See—*
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Yamauchi, Junnosuke; Okamura, Takayuki; and Minatono, Shobu, to Kuraray Co., Ltd. Process for the production of modified cis-14,-polyisoprene. 3,965,076, Cl. 260-42.000.

Yamazaki, Kazue. Ignition plug for use in internal combustion engines. 3,965,384, Cl. 313-142.000.

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274 3,964,258
290 3,964,259
413 3,964,260
445 3,964,261
447 3,964,262
618 3,964,263

**CLASS 61**
20 3,964,264
45C 3,964,265
70 3,964,266

**CLASS 62**
9 3,964,891
51 3,964,267
121 3,964,268
137 3,964,269
138 3,964,270
239 3,964,271
3,964,272
476 3,964,273

**CLASS 65**
328 3,964,892

**CLASS 66**
91 3,964,275
123 3,964,274
154A 3,964,276
190 3,964,277

**CLASS 68**
5E 3,964,278
205R 3,964,279

**CLASS 70**
84 3,964,280
120 3,964,281

**CLASS 71**
65 3,964,893
90 3,964,894
3,964,895
92 3,964,896

**CLASS 72**
19 3,964,282
42 3,964,283
54 3,964,284
69 3,964,285
176 3,964,286
210 3,964,287
306 3,964,288
381 3,964,289
466 3,964,290

**CLASS 73**
1B 3,964,291
40.5A 3,964,293
40.5R 3,964,292
53 3,964,294
61.1R 3,964,295
67.5R 3,964,296
67.8R 3,964,297
84 3,964,298
88F 3,964,299
100 3,964,300
116 3,964,301
117.3 3,964,302
146 3,964,303
147 3,964,304
151 3,964,305
179 3,964,307
194A 3,964,308
3,964,309
194R 3,964,306
207 3,964,310
295 3,964,311
314 3,964,312
343B 3,964,313
359R 3,964,314
362AR 3,964,315
432SD 3,964,316
453 3,964,317
557 3,964,319

**CLASS 74**
10.8 3,964,320
12 3,964,321
55 3,964,322
60 3,964,323
215 3,964,324
219 3,964,325
230.05 3,964,326
230.17A 3,964,327
231C 3,964,328
233 3,964,329
240 3,964,330
242.1FP 3,964,331
325 3,964,332
410 3,964,334
422 3,964,344
425 3,964,335
471R 3,964,318
501M 3,964,336
501P 3,964,337
520 3,964,338
551.9 3,964,339
3,964,340
572 3,964,341
573R 3,964,342
594.6 3,964,343
665P 3,964,345
711 3,964,346
733 3,964,347

**CLASS 75**
10R 3,964,897
10S 3,964,901
11 3,964,898
53 3,964,899
94 3,964,900
123E Re.28,878
225 3,964,902

**CLASS 76**
26 3,964,348
41 3,964,349

**CLASS 81**
9.5A 3,964,350
52.4R 3,964,351
426 3,964,352

**CLASS 83**
1 3,964,353
39 3,964,354
169 3,964,355
302 3,964,356
318 3,964,357
400 3,964,358
430 3,964,359
464 3,964,360
471.3 3,964,361

**CLASS 84**
173 3,964,362
399 3,964,363

**CLASS 85**
72 3,964,364

**CLASS 89**
43R 3,964,365
141 3,964,368
148 3,964,366

**CLASS 90**
5 3,964,369
11C 3,964,367

**CLASS 91**
395 3,964,370
434 3,964,371
471 3,964,372

**CLASS 93**
1C 3,964,373
36MM 3,964,374
36.5R 3,964,375

**CLASS 96**
1SD 3,964,903
1.5 3,964,904
4 3,964,905
33 3,964,906
35 3,964,907
35.1 3,964,908
36.2 3,964,909
46 3,964,910
49 3,964,911
66.3 3,964,912

**CLASS 98**
59 3,964,376
116 3,964,377

**CLASS 99**
425 3,964,378
541 3,964,379

**CLASS 100**
9 3,964,380
34 3,964,381

**CLASS 101**
1 3,964,382
44 3,964,383
93.48 3,964,384
128.4 3,964,385
169 3,964,386
224 3,964,387
426 3,964,388
467 3,964,389

**CLASS 102**
1R 3,964,390
4 3,964,391
8 3,964,392
37.6 3,964,393
39 3,964,394
70.2R 3,964,395
79 3,964,396

**CLASS 104**
9 3,964,397
148MS 3,964,398

**CLASS 105**
406R 3,964,399

**CLASS 106**
10 3,964,913
19 3,964,914
38.27 3,964,916
38.6 3,964,915
39.6 3,964,917
47Q 3,964,918
47R 3,964,919
53 3,964,920
90 3,964,921
100 3,964,922
189 3,964,923
286 3,964,924

**CLASS 108**
51 3,964,400
64 3,964,401
3,964,402
90 3,964,403
144 3,964,404

**CLASS 110**
8A 3,964,406

**CLASS 111**
6 3,964,405

**CLASS 112**
79A 3,964,408
79R 3,964,407
121.15 3,964,409
121.26 3,964,410
410 3,964,411

**CLASS 113**
7R Re.28,872
3,964,412
120AA 3,964,413
121C 3,964,414
3,964,415

**CLASS 114**
20A 3,964,416
66.5H 3,964,417
70 3,964,418
106 3,964,419
208R 3,964,420
3,964,421
219 3,964,422
230 3,964,423
235WS 3,964,425
235B 3,964,424

**CLASS 115**
3 3,964,426

**CLASS 116**
124B 3,964,427
129H 3,964,428

**CLASS 118**
7 3,964,429
49 3,964,430
60 3,964,431
314 3,964,432
3,964,433
405 3,964,434
630 3,964,435
637 3,964,436

**CLASS 119**
1 3,964,437
3,964,438
17 3,964,439
18 3,964,440
109 3,964,441

**CLASS 123**
8.01 3,964,445
8.13 3,964,446
8.41 3,964,447
8.45 3,964,442
3,964,448
32EA 3,964,443
41.49 3,964,444
41.51 3,964,449
55AA 3,964,450
75B 3,964,451
78AA 3,964,452
90.43 3,964,453
117R 3,964,456
119F 3,964,457
122H 3,964,458
140FG 3,964,459
146.5A 3,964,453
148DS 3,964,454
191S 3,964,460

198DC 3,964,461
198E 3,964,462

CLASS 126
41R 3,964,463
270 3,964,464
350B 3,964,465
361 3,964,466

CLASS 128
1R 3,964,467
2B 3,964,468
2.1E 3,964,469
3,964,470
.65 3,964,471
66 3,964,472
82.1 3,964,473
87B 3,964,474
132R 3,964,475
145.6 3,964,476
172.1 3,964,477
203 3,964,478
214R 3,964,479
215 3,964,480
218A 3,964,481
249 Re.28,873
260 3,964,482
266 3,964,483
276 3,964,484
283 3,964,485
284 3,964,486
303.14 3,964,487
351 3,964,488
360 3,964,489
419R 3,964,490
476 3,964,491

CLASS 130
27T 3,964,492

CLASS 131
10.5 3,964,493
17R 3,964,494
3,964,495
3,964,496
3,964,497
3,964,498

CLASS 132
7 3,964,499
3,964,500
11A 3,964,501
3,964,502

CLASS 134
21 3,964,925
117 3,964,926

CLASS 136
26 3,964,927
86A 3,964,928
86R 3,964,929
3,964,930
107 3,964,931
111 3,964,932
121 3,964,933
135R 3,964,934

CLASS 137
39 3,964,503
3,964,504
85 3,964,506
106 3,964,505
375 3,964,507
377 3,964,508
525.1 3,964,509
528 3,964,510
614.06 3,964,511
615 3,964,512
624.18 3,964,513
625.17 3,964,514
625.27 3,964,515
625.38 3,964,516
625.43 3,964,517
625.64 3,964,518

CLASS 138
37 3,964,519
89 3,964,520
176 3,964,521

CLASS 139
142 3,964,523
190 3,964,524

CLASS 140
92.1 3,964,525

CLASS 141
1R 3,964,526
8 3,964,527
67 3,964,528

CLASS 148
2 3,964,935
6.27 3,964,936
6.35 3,964,937
12B 3,964,938
105 3,964,939
175 3,964,940
187 3,964,941

CLASS 150
32 3,964,529

CLASS 151
29 3,964,530
41.7 3,964,531

CLASS 152
330RF 3,964,532
362R 3,964,533

CLASS 156
2 3,964,942
6 3,964,943
40 3,964,944
52 3,964,945
59 3,964,946
64 3,964,947
91 3,964,948
96 3,964,949
110A 3,964,950
272 3,964,951
296 3,964,952
300 3,964,953
331 3,964,954
332 3,964,955
345 3,964,956
3,964,957
382 3,964,958
433 3,964,959

CLASS 159
49 3,964,960

CLASS 162
96 3,964,961
236 3,964,962

CLASS 164
7 3,964,534
66 3,964,535
98 3,964,536
136 3,964,537
228 3,964,538
277 3,964,963
303 3,964,539
323 3,964,540
3,964,541
329 3,964,542

CLASS 166
.5 3,964,543
256 3,964,545
261 3,964,546
269 3,964,547
273 3,964,548
315 3,964,544

CLASS 169
37 3,964,549

CLASS 171
61 3,964,550

CLASS 173
73 3,964,551
164 3,964,552

CLASS 174
2 3,965,285
42 3,965,286
66 3,965,287

CLASS 175
4.51 3,964,553
17 3,964,554
44 3,964,555
45 3,964,556
66 3,964,557
107 3,964,558

CLASS 176
19LD 3,964,964
37 3,964,965
38 3,964,966
80 3,964,967
81 3,964,968
87 3,964,969

CLASS 178
5.8A 3,965,288
6 3,965,289
3,965,290
7.2 3,965,291
7.3D 3,965,299
42 3,965,292
69A 3,965,293
3,965,294

CLASS 179
1SH 3,965,298
1A 3,965,295
1.5R 3,965,296
3,965,297
15AT 3,965,301
15BT 3,965,302
15FS 3,965,300
18EB 3,965,305
18FG 3,965,303
18B 3,965,304
81R 3,965,306
84T 3,965,307
99 3,965,308
175.31R 3,965,309
189D 3,965,310

CLASS 180
1AP 3,964,559
5R 3,964,560
6.7 3,964,561
27 3,964,562
33R 3,964,563
70R 3,964,564
103R 3,964,565
133 3,964,566

CLASS 181
33HA 3,964,568
3,964,569
56 3,964,570
150 3,964,571

CLASS 182
86 3,964,572
116 3,964,573
204 3,964,574
230 3,964,575

CLASS 184
7A 3,964,576

CLASS 186
1R 3,964,577

CLASS 188
1C 3,964,578
71.9 3,964,579
73.1 3,964,580
73.3 3,964,581

CLASS 192
58B 3,964,582
85AA 3,964,583
87.11 3,964,584
87.13 3,964,585
107C 3,964,586
113B 3,964,587

CLASS 193
36 3,964,588

CLASS 194
10 3,964,589
83 3,964,590

CLASS 195
2 3,964,970
28VB 3,964,971
31P 3,964,972
68 3,964,973
103.5C 3,964,974

CLASS 196
132 3,964,975

CLASS 197
1R 3,964,591
49 3,964,592
98 3,964,593
3,964,594
170 3,964,595

CLASS 198
16MS 3,964,596
21 3,964,597
35 3,964,598
39 3,964,599
220BA 3,964,601
220CA 3,964,600

CLASS 200
6A 3,965,315
16C 3,965,311
39R 3,965,312
61.27 3,965,313
61.53 3,965,314
67D 3,965,316
82E 3,965,317
148R 3,965,318
310 3,965,319
314 3,965,320

CLASS 201
2 3,964,976
40 3,964,977

CLASS 203
9 3,964,978
3,964,979
42 3,964,980

CLASS 204
1T 3,964,981
3,964,982
59L 3,964,983
157.1H 3,964,984
180P 3,964,985
192 3,964,986
194 3,964,987
195M 3,964,988
211 3,964,989
275 3,964,990
3,964,991
299R 3,964,992

CLASS 206
75 3,964,602
76 3,964,603
219 3,964,604
349 3,964,605
395 3,964,606
427 3,964,607
451 3,964,608
540 3,964,609

CLASS 208
13 3,964,993
196 3,964,994
210 3,964,995

CLASS 209
17 3,964,996
166 3,964,997

CLASS 210
7 3,964,998
23R 3,964,999
24 3,965,000
28 3,965,001
46 3,965,002
58 3,965,003
73W 3,965,004
96R 3,965,005
138 3,965,006
169 3,965,007
192 3,965,008
218 3,965,009
283 3,965,010
400 3,965,011
433M 3,965,012
519 3,965,013

CLASS 211
5 3,964,610
3,964,611
26 3,964,612
64 3,964,613

CLASS 212
9 3,964,614

CLASS 214
1BD 3,964,616
1B 3,964,615
10.5R 3,964,617
3,964,618
16B 3,964,619
41R 3,964,620
85.5 3,964,621
145A 3,964,622
310 3,964,623
314 3,964,624
502 3,964,625
505 3,964,626

CLASS 215
247 3,964,627

CLASS 219
10.41 3,965,321
10.55B 3,965,322
3,965,324
10.55E 3,965,323
10.55R 3,965,325
121EB 3,965,326
121LM 3,965,327
3,965,328
124 3,965,329
216 3,965,330
3,965,331
3,965,332
243 3,965,333
399 3,965,334

CLASS 220
19 3,964,628
23.86 3,964,629
63R 3,964,630
72 Re.28,874
90.4 3,964,631
270 3,964,632
273 3,964,633
281 3,964,634
306 3,964,635
3,964,636
314 3,964,637

CLASS 221
3 3,964,638
278 3,964,639

CLASS 222
81 3,964,640
82 3,964,641
142.4 3,964,642
145 3,964,643
146HE 3,964,644
3,964,645
174 3,964,647
189 3,964,646
333 3,964,648
399 3,964,649
450 3,964,650

CLASS 223
91 3,964,651

CLASS 224
4E 3,964,652
5P 3,964,653
8R 3,964,654

CLASS 225
97 3,964,655

CLASS 226
3,964,656
177 3,964,657
190 3,964,658

CLASS 227
8 3,964,659
15 3,964,660
18 3,964,661
95 3,964,663

CLASS 228
6A 3,964,664
44.1R 3,964,665
106 3,964,666
157 Re.28,875
194 3,964,667

CLASS 229
35 3,964,668
40 3,964,669
51ST 3,964,670
51TS 3,964,671

CLASS 234
35 3,964,672
115 3,964,673

CLASS 235
61.9R 3,965,335
88RC 3,964,674
92FL 3,965,337
92FQ 3,965,336
150.52 3,965,338
151.3 3,965,339
151.32 3,965,340
151.34 3,965,341
156 3,965,342
3,965,343
197 3,965,344

CLASS 236
15C 3,964,675
46R 3,964,676
3,964,677

CLASS 237
1A 3,964,678

CLASS 238
17 3,964,679
366 3,964,680

CLASS 239
2S 3,964,682
15 3,964,683
56 3,964,684
66 3,964,685
74 3,964,686
226 3,964,687
3,964,688
318 3,964,689
650 3,964,681
662 3,964,714

CLASS 240
47 3,965,345
52R 3,965,346

CLASS 241
7 3,964,715
28 3,964,716
71 3,964,717
79 3,964,718
101.7 3,964,719
186A 3,964,720

CLASS 242
7.22 3,964,522
18PW 3,964,690
3,964,721
3,964,722
35.5A 3,964,723
43R 3,964,724
47 3,964,691
54R 3,964,692

CLASS 243
24 3,964,693

CLASS 244
3.15 3,964,694
3.16 3,964,695
3.23 3,964,696
64 3,964,697
100A 3,964,698
118R 3,964,699
138R 3,964,700

CLASS 246
2F 3,964,701
4 3,964,702
34R 3,964,703
125 3,964,704

CLASS 248
27R 3,964,705
49 3,964,707
126 3,964,708
133 3,964,709
206R 3,964,710
210 3,964,711
223 3,964,712
418 3,964,713
421 3,964,725

CLASS 249
90 3,964,726

CLASS 250
211J 3,965,347
233 3,965,348
236 3,965,349
302 3,965,350
305 3,965,351
315A 3,965,352
336 3,965,353
3,965,354
341 3,965,355
343 3,965,356
360 3,965,357
369 3,965,358
432R 3,965,359
461R 3,965,360
468 3,964,107
3,965,361

CLASS 252
8.7 3,965,014
8.8 3,965,015
25 3,965,016
33.3 3,965,017
59 3,965,018
3,965,019
62 3,965,020
62.1L 3,965,023
62.1P 3,965,021
3,965,022
95 3,965,024
106 3,965,025
3,965,026
180 3,965,027
3,965,028
299 3,965,029
3,965,030
301.4R 3,965,031
306 3,965,032
316 3,965,033
321 3,965,034
412 3,965,035
414 3,965,036
415 3,965,037
416 3,965,038
426 3,965,039
435 3,965,040
437 3,965,041
455R 3,965,042
3,965,043
465 3,965,044
466J 3,965,045
472 3,965,046
503 3,965,047
527 3,965,048

CLASS 254
138 3,964,730

CLASS 259
4R 3,964,731
10 3,964,732
103 3,964,733

CLASS 260
2A 3,965,050
2M 3,965,049
2.5AK 3,965,051
2.5AW 3,965,052
2.5HA 3,965,053
3,965,054
3 3,965,055
17.2 3,965,056
18TN 3,965,057
21 3,965,058
22CB 3,965,059
25 3,965,061
27BB 3,965,060
28.5AV 3,965,062
29.6TA 3,965,063
30.6R 3,965,064
37SB 3,965,065
45.75N 3,965,068
45.8A 3,965,067
47ET 3,965,069
73R 3,965,070
75R 3,965,071
77.5AN 3,965,073
77.5C 3,965,072
77.5R 3,965,074
78L 3,965,075
78.4D 3,965,076
79.5P 3,965,077
96.5R 3,965,084
97.6 3,965,085
123.5 3,965,086
152 3,965,087
210AB 3,965,089
3,965,090
210R 3,965,088
231A 3,965,091
239BD 3,965,092
239.1 3,965,093
240C 3,965,094
240G 3,965,096
3,965,097
240J 3,965,095
243C 3,965,098
3,965,099
251A 3,965,100
256.4H 3,965,101
286R 3,965,102
293.55 3,965,103
293.64 3,965,104

293.72 3,965,105
293.83 3,965,106
294.8C 3,965,107
3,965,108
294.9 3,965,109
306.8D 3,965,110
308C 3,965,111
309.2 3,965,113
309.6 3,965,112
309.7 3,965,114
335 3,965,115
338 3,965,116
340.3 3,965,117
343.3R 3,965,118
3,965,119
343.6 3,965,120
3,965,121
345.2 3,965,122
346.2M 3,965,124
346.3 3,965,125
346.8M 3,965,123
3,965,126
347.3 3,965,127
348A 3,965,129
348C 3,965,128
396R 3,965,130
397.1 3,965,131
410.9R 3,965,132
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| D2— | 232 | 240,310 | D15— | 33 | 240,336 | D26—14G | | 240,315 | | 23R | 240,320 | D52— | 4R | 240,326 | | | 240,331 |
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## CLASSIFICATION OF PLANTS

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| 3,964,748 | 3,964,466 | 3,965,146 | 3,965,470 | 3,964,524 | 3,964,673 |
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| 6 | 240,313 | | 240,333 | 20 | 240,324 | 36 | 240,317 | 37 | 240,316 | 45 | 240,314 |
| | 240,315 | 12 | 240,312 | 24 | 240,327 | | 240,318 | | 240,320 | 48 | 240,328 |
| | 240,326 | | 240,322 | 27 | 240,310 | | 240,334 | 42 | 240,325 | 53 | 240,323 |
| 8 | 240,311 | 18 | 240,329 | 34 | 240,338 | | 240,339 | 44 | 240,337 | 55 | 240,336 |
| | 240,319 | | | | | | | | | | |

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| 6 | 3,924 | 3,925 | 42 | 3,916 | 3,917 |

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U.S. DEPARTMENT OF COMMERCE
Elliot L. Richardson, Secretary

PATENT AND TRADEMARK OFFICE
C. Marshall Dann, *Commissioner*